AVIATION

The Oldest American Aeronautical Magazine

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Capt. Charles A. Lindbergh waving greetings from balcony of the Aero Club, Paris.

Acme Photo

VOLUME XXII

NUMBER 23

SPECIAL FEATURES

FUEL AND OIL CONSUMPTION ON LONG DISTANCE FLIGHTS

NATIONS CONFER HONORS ON CAPT. CHARLES A. LINDBERGH

CHICAGO, THE AIR TRANSPORT CENTER

AVIATION PUBLISHING CORP.
HIGHLAND, N. Y.
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Mobiloil flies

3700-mile flight gives lubrication

Filling up the plane with Mobiloil "B"

A 25-YEAR old aviator, flying alone, has literally set the world afire. New York waited breathless for word from Capt. Charles Lindbetgh while Paris prepared to give him a frenzied welcome. Cities, towns and hamlets on both sides of the Atlantic went wild with tejoicing when the word was flashed, "He's in Paris."

In 33½ hours, Capt. Lindbergh flew ovet 3700 miles, a few days after he completed a record-breaking flight from San Diego to New Yotk.

In this spectacular flight, as in other outstanding air events, lubrication played its important role. There could be no mistake. The single Wright Whirlwind engine in the Ryan plane must function perfectly.

And it did.

In a press interview shortly after his arrival in Paris, Lindbergh said, "We had the worst possible weather for over 1000 miles over the open sea. I cannot say too much for the way the ship and the motor stood up under all this punishment."

Capt. Lindbergh placed his entire lubrication ptoblem in the hands of the Gargoyle Mobiloil Engineers. Mobiloil "B" was prescribed.

CABLEGRAM

Vacuum Oil Company
New York

In my flight from New York to Paris my engine was lubricated with Gargoyle Mobiloil "B" and I am happy to say that it gave me every satisfaction. My engine functioned perfectly.

Charles A. Lindbergh

Captain Charles Lindbergh

Paris, France—Capt. Lindbergh congratulated by Myron T. Herrick, U. S. Ambassador to France. This photo, taken in Paris May 22nd, was carried to London by airplane and sent to New York by radio for the Vacuum Oil Company.

with Lindbergh

its greatest test in history

The oil used was not a special oil. It was the same Gatgoyle Mobiloil "B" that is used by aviators in all parts of the world.

The Mobiloil Engineers keep in close touch with all aeronautical developments.

The majority of airplane builders use Mobiloil for test and development work. Mobiloil is chosen again and again for difficult and hazardous flying.

In your plane Mobiloil will give ttouble-free lubrication just as it did in Capt. Lindbergh's plane. And Mobiloil dealers are nearby wherever you land.

When Commander Byrd flew to the North Pole—he used Mobiloil "B"

When the U. S. Army fliers circumnavigated the globe—they used Mobiloil "B"

When Lieutenant Maughan in 1924 flew across the United States from dawn-to-dusk—he used Mobiloil "B"

When Capt. Lindbergh flew from San Diego to New York—he used Mobiloil "B"

And now—Capt. Lindbergh has flown from New York to Paris—with Mobiloil "B" in his engine.

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With the Editor

To adequately treat the achievement of the Lindbergh flight in a style that AVIATION readers expect requires time. Hurried descriptions of plane, engine, accessories and technical interpretations could be prepared by the editorial staff but such information would not have the authoritative value that AVIATION desires. News of Captain Lindbergh's triumph abroad is contained in this issue but the more detailed engineering aspect of the flight will be held until our issue of June 20 which will be devoted to welcoming him home.

The technical account of the fuel consumption in this issue is the type of article that it is hoped may be secured on all of the engineering phases of the trip. If this astonishing example of courage is to be made of the greatest value, the technical interpretations should receive study from every viewpoint.

He will be greeted on his return by millions of well wishers but none will be more enthusiastic nor sincere than those who regard his thirty-three and a half hour lonely trans-Atlantic hop as marking a new epoch in mechanical as well as physical endurance. It is the mechanical side that AVIATION is to treat and there is being assembled from those whose products were used on the plane as complete technical descriptions as possible. The issue of June 20 will be a "Welcome Home" number.

AVIATION

The Oldest American Aeronautical Magazine

VOL. XXII JUNE 6, 1927 No. 23

A Great Stimulus to Commercial Aviation

AN IMPORTANT reaction to the flight of Capt. Charles Lindbergh from New York to Paris is the strong impetus that the performance has given to the financial and commercial aspect of aviation.

Splendid as it was as a demonstration of intrepidity and good airmanship, it was no less outstanding as an exposition of American achievement in the field of aeronautical craftsmanship. Lindbergh's equipment was the joint product of the American aeronautical industry and American in every detail as well as design. The Ryan airplane was rearranged to accommodate the larger fuel supply, and with additional wing area to take care of the increased load; an American aeronautical engine was out of the stock room, and instruments were those available in the market for the equipment of any airplane.

The perfection with which the airplane, engine and instruments functioned throughout the 3,360 miles trans-Atlantic passage occasioned no more surprise to those who have kept in touch with the advancement in our aeronautical industry than did the splendid airmanship of Capt. Lindbergh to those who were familiar with his record as a commercial aviator. It took but this epochal flight to impress the general public with the degree of confidence in the commercial possibilities of the airplane that has been felt, all along, by those in close touch with the development of aviation.

In his thirty-three and a half hour flight from New York to Paris Lindbergh opened the eyes of the world to the commercial possibilities of the airplane, which already were being demonstrated in a less spectacular manner in the successful day and night operations by American and European air transport lines. The vision of this courageous young American, winging his lonely way across the expanse of the Atlantic ocean, gripped the whole world. His every move was closely followed. Attention was riveted on the man, the plane, the engine and the instruments that were to keep him on his course. It was thus that the people in general came to a vivid realization of the dependability of the airplane in a commercial way. The effect in business circles was instantaneous. Trading on the exchange in aeronautic securities, that had lain dormant, became active. The shares of the company that built the motor, that never faltered between New York and Paris, rose in price. Abroad, interest has been revived in a possible airplane service between Europe and America, with a landing station in mid-ocean, while our own financiers are giving serious thought to the commercial prospects of flying, because this feat has brought to them a truer appreciation of the possibilities of the airplane.

"The Great Delusion"

MUCH WILL be read in the coming month about the English book that is being republished in this country which makes such a violent attack on aircraft. Its author, "Neon," has selected his *nom de plume* with the idea that he was to correspond to the gas that has as one of its qualities the ability to penetrate fog. As has been pointed out, he entirely overlooked the fact that neon is normally inert but when used for aviation purposes it emits a fiery red glare. This is just what the book does.

The author is not known but from the contents of the book it is clearly evident that he has some connection with the British Navy. As is well known, this service has been greatly irritated by having its "eyes" furnished by another arm. No method of attack has been overlooked and in some instances what may be termed misrepresentation has been used, probably, unconsciously.

The book will be answered when space permits. A mere review in AVIATION would neglect an opportunity that the book gives to refute some of the absurd claims. Appearing as it does at a time when the world is marveling at the trans-Atlantic flight, it will be regarded as a curiosity rather than a serious effort.

Passenger and Mail Traffic

ONE OF the problems that will soon have to receive careful consideration by the air transport operators is the carrying of passengers over the established air mail routes. By Fall, all of the air mail contract routes will have had enough experience in operation to commence a passenger service if it is believed to be profitable. It is in this form of aerial transportation alone that this country is far behind Europe for reasons that have often been given.

The combination of carrying passengers and mail is obviously unwise. The mail must get through. Weather or delayed connections must be surmounted. Everything, even safety to a great degree, must be sacrificed to the one objective of securing prompt delivery of letters and packages. With passengers, not only is a different type of plane required but every precaution must be taken for the safety and comfort of the travelers by air. Instead of being insistent on schedules being met and delays being avoided the passenger carrying planes must take into account only the safe and comfortable transport of their human load. It would therefore appear that the carrying of mail and passengers in the same plane will be inadvisable if a maximum of service is to be given both services.

Fuel and Oil Consumption Important Factors On Long Distance Flights

Good Results Obtained by Charles A. Lindbergh With a Whirlwind Air-Cooled Engine on Cross-Continent and Trans-Atlantic Trips

By R. V. CAUTLEY
Wright Aeronautical Corporation

IN A recent address to the members of the graduating class of the Naval War College at Newport, R. I., Secretary of the Navy Wilbur made the following statement: "The exceptional skill and endurance of Lindbergh invoke our enthusiastic praise. His skill as a navigator astounds us, but from the standpoint of national defense and development of aviation the perfect performance of the engine in all vicissitudes from San Diego to Paris is the most significant. Given a properly constructed plane, an adequate supply of fuel, and a skillful aviator, success and safety depends almost entirely on the reliability of the engine.

"That the air-cooled engine used by Lindbergh was developed by the manufacturer with the financial and engineering co-operation of the Navy is sufficient evidence that the Navy has been striving for success in aviation and is ambitious to expand the capabilities of aircraft."

Coming so soon after the 51 hour non stop endurance flight of Chamberlin and Acosta in the Wright-Bellanca plane, the records of Capt. Charles A. Lindbergh's three hops from San Diego, Calif., to Paris, France, form a most interesting and welcome basis for a scientific and practical study of the behaviour of a stock "Whirlwind" engine in long distance cross-country flying, with range in miles instead of endurance in hours as the primary object.

Tries Different Altitudes

The records of Captain Lindbergh's flights from San Diego to New York, are given fairly completely in a log sheet which he made up en route and finished after his arrival in New York. A thorough and complete study of his flight from New York to Paris must wait the publication of the record made by his sealed barograph on the way over, but we already know enough from his published account of the flight to be certain that he tried out all altitudes from about 10 ft. above sea level to 10,000, and that he met with great variations in temperature and weather.

With the engine functioning perfectly every second of the time from San Diego all the way to Paris, the chief scientific and practical interest naturally centers around the fuel consumption, the oil consumption, and the condition of the engine with regard to normal operation and wear on parts at the end of the long journey. The condition of the engine is best vouched for by the fact that Captain Lindbergh did not desire an overhaul before starting out for a flight over Paris followed by a flight to Brussels and then to London. On its arrival at Paris the engine had had about 61 hours in the air, and Captain Lindbergh is probably right in his estimate that it will be flown at least another 200 hours before there will be any use in tearing it down to examine the internal parts. The figures for fuel and oil consumption, however, are worthy of detailed study.

Uses 1692 lb. of Fuel

Let us consider first the flight from San Diego to St. Louis, followed by the flight from St. Louis to New York. 250 gal. of fuel were put in the tanks at San Diego, and 150 more at St. Louis, a total of 400 gal. 118 gal. were drained out at New York, showing that 282 gal. or 1692 lb of fuel, had been burned in about 24 hr. flying. These twenty-four hours were made up of 21 hr. 20 min flying time from field to field, 25 min. in circling fields and towns before landing, and 2 hr. 15 min. in test and demonstration flights at St. Louis and New York. 282 gal. in 24 hr. flying gives an hourly fuel consumption of exactly 11¾ gal.

Taking conservative figures for the airline distance, St. Louis is 1480 miles from San Diego, and New York is 940 miles from St. Louis, giving a total airline distance flown of 2,420 miles. The average speed for 2,420 miles flown in 21 hr. 20 min. is 113.4 m.p.h. The 1480 miles of the first leg were covered at an average of 105 m.p.h., 14 hr. 5 min., and the 940 miles of the second leg were covered in 7 hr. and 15 min., giving an average speed of 129.7 m.p.h.

Varies Fuel Mixtures

Although a fuel consumption of 11¾ gal. per hour seems extraordinarily good for such average speed, the overload figures are improved upon by a good margin in the trans-Atlantic flight. There are probably at least two good reasons for this. On the trans-continental flight, Lindbergh was in process of gaining experience with the Wright "Whirlwind" J-5 type of engine, and experimenting with the use of the mixture control. The log given shows the mixture was set at full rich during the first four hours of flying, but that a leaner mixture was used during the latter part of the flight. Moreover, Lindbergh may still have had in mind the failing which the Wright "Whirlwind" J-5 does not share with the general run of air-cooled engines, that of overheating when running on a lean mixture. In the second place the Wright carburetor air intake heater, a device of new design which is now standard equipment on all Wright "Whirlwind" engines, was added to Captain Lindbergh's engine in New York, and would unquestionably have some effect in improving the fuel consumption.

Lindbergh's Log Unusual

A study of Captain Lindbergh's unusually clear and excellent log for his two hops from San Diego to New York throws further light on the fuel consumption. The log of the flight from San Diego to St. Louis divides naturally into two parts. The first 4½ hr. were apparently flown with the engine turning an average of 1620 revolutions per minute developing about 134 hp., with the mixture setting at full rich or nearly so. The remaining 9½ hr. were apparently flown with the engine turning about 1715 r.p.m., developing about 160 hp., with the mixture set from three to four notches toward the lean end. How much was gained by the use of the mixture control is indicated by the fact that in the average of a large number of dynamometer tests on different engines, the difference between the specific fuel consumption for full rich setting and the best setting without loss of power, between 1600 and 1700 r.p.m., is about .025 lb./hp./hr. The estimates of horsepower at various speeds are taken from an average curve based on full throttle power at 1956 r.p.m. Using the power figures thus calculated, the average fuel consumption for the 24 hr. flying, using 282 gal. of gasoline, is .509 lb./hp./hr.

The average horsepower output of Lindbergh's engine is necessarily based on level flight, as the log does not enable us to say how much of the time he was climbing. This fact introduces a considerable error in the calculation of specific fuel consumption, as for the actual average power output, taking climb into consideration, the specific fuel consumption must have been very much lower than .509 lb. per hp./hr. Some idea of how much difference the climbing would make can be gained from comparing the full throttle horsepower at 1620 revolutions, which is a shade over 200 hp., with the horsepower at 1620 revolutions on Lindbergh's propeller load curve, which comes to 134 hp. Or compare the average full throttle full rich consumption for "Whirlwind" engines at 1620 revolutions with the average propeller load full rich fuel consumption, and you find that the former is nearly .56 lb./hp./hr. as compared with .51 lb./hp./hr. for the latter.

Small Oil Consumption

When we consider further that this propeller load curve is based on a maximum r.p.m. of 1950 revolutions in level flight with a light load, and that the maximum r.p.m. are considerably cut down when the plane is loaded the way Lindbergh's plane was loaded, it is obvious that we have been more than conservative in giving an average fuel consumption as .509 lb./hp./hr., and that the actual specific fuel consumption could have been easily in the neighborhood of .45 lb./hp./hr.

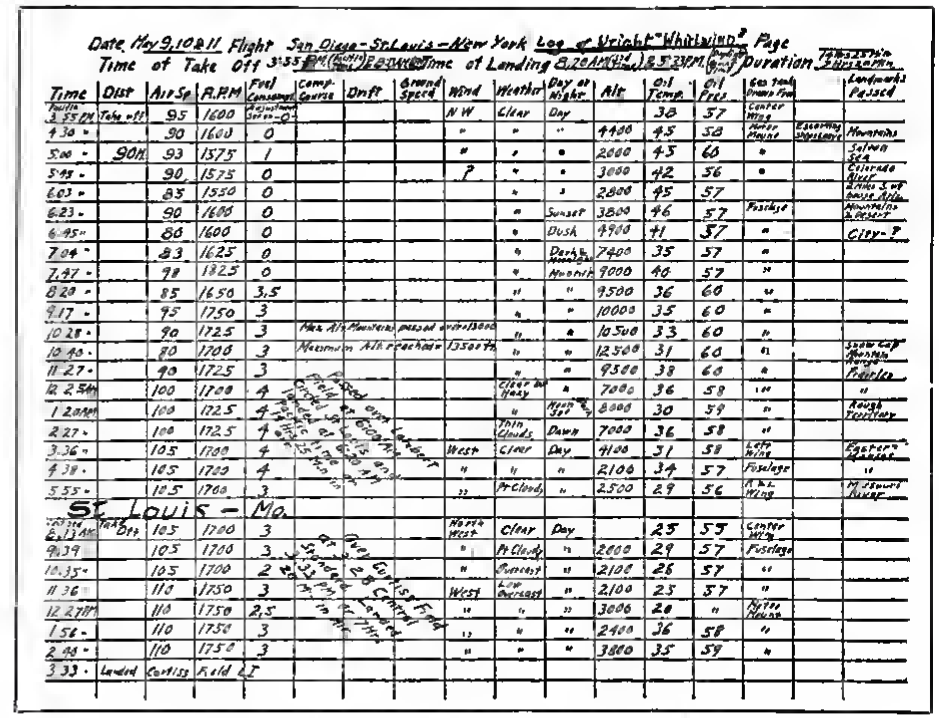
The oil was drained from Captain Lindbergh's plane upon completion of his flight to New York. It was found that exactly three gallons had been used for the 22 hr. flying, which gives an average consumption of less than 1.1 pints per hour. The specific fuel consumption of .509 lb./hp. compares with a guaranteed maximum consumption for the "Whirlwind" of .60 lb./hp./hr. The specific oil consumption of .0072 lb./hp./hr. compares with a guaranteed maximum of .035.

Averaged 1600 r.p.m.

Some confusion exists in the newspaper figures given for Captain Lindbergh's fuel consumption from New York to Paris. This may be due to the fact that he started his flight fully loaded with 452 gal. of fuel distributed between five different tanks. The three wing tanks contained 57 gal., 38 gal., and 60 gal. respectively. The two fuselage tanks contained 86 gal. and 211 gal. respectively. It was first reported that he had used 432 gal. in flight, but evidently the contents of one of the tanks had been neglected in draining the plane, as a subsequent report showed the discovery of an additional quantity of fuel variously given as from 62 to 80 gal. Taking the lowest figure, 62 gal., gives us a total consumption for the flight of 370 gal. The flight was made in 33 hr. and 20 min., so the fuel consumption was 11.1 gal. per hour, as compared with 11.75 gal. per hour for the trans-continental flight. As the airline distance is over 3,600 miles, his average speed was better than 108 m.p.h. How much better, we cannot say, as we cannot tell the exact distance he traveled.

To obtain a figure for specific fuel consumption, we can only use Lindbergh's cabled report that his average r.p.m. was about 1600 on the flight. This corresponds to about 129 hp. on the propeller load curve, giving a specific consumption of .516 lb./hp./hr. Considering the tremendously

(*Continued on page 1243*)



Log of Capt. Charles A. Lindbergh's cross-continent flight from San Diego to St. Louis to New York

Rulers of Three Nations Confer Honors Upon Captain Charles A. Lindbergh

Wildly Acclaimed in European Capitals While New York City Completes Plans for History Making Reception

EVER SINCE Captain Charles A. Lindbergh first touched the wheels of his Ryan monoplane on the broad expanse of Le Bourget airdrome he has been the center of a series of congratulatory receptions never before accorded a single individual. France, Belgium and England have wildly acclaimed him and if arrangements now being made for his welcome to New York are carried out as now planned Captain Lindbergh's return to the U. S. A. will be comparable in enthusiasm and demonstration to the return of America's troops after the termination of the World War.

It has been estimated that over 100,000 men and women were on hand to witness his arrival at Le Bourget, and the minute that his plane settled on the ground they swept forward as one person to extend personal greetings. So great indeed was the human deluge that members of the police and military forces were unable to clear a path so that the aerial ace could be led off the field, and it was some time before Captain Lindbergh was deposited safely behind the closed doors of a hangar. Eventually the air hero was taken to the American Embassy as the personal guest of Ambassador Herrick. There Captain Lindbergh was able to partake of ten hours of much needed sleep, while the praise bestowing crowds cheered his name to the echo about the streets of Paris. When he awoke the next morning somewhat refreshed after his strength sapping ordeal he was presented to M. Doumergue, president of France, who personally decorated him with the Legion of Honor, and from that moment until he took off again in his trans-Atlantic plane for the city of Brussels, six days later, Captain Lindbergh was banqueted and honored by all the high governmental and military officials in Paris.

Receives Order of Leopold

At Evre airdrome at Brussels some 50,000 cheering Belgiums saluted his arrival, and after a night and a day's sojourn in the Belgium capital during which time he was presented to the King and Queen of Belgium, decorated with the Order of Leopold and feted by political and military leaders the air hero took off from Evre airdrome and headed towards the Croydon field just outside the city of London, England.

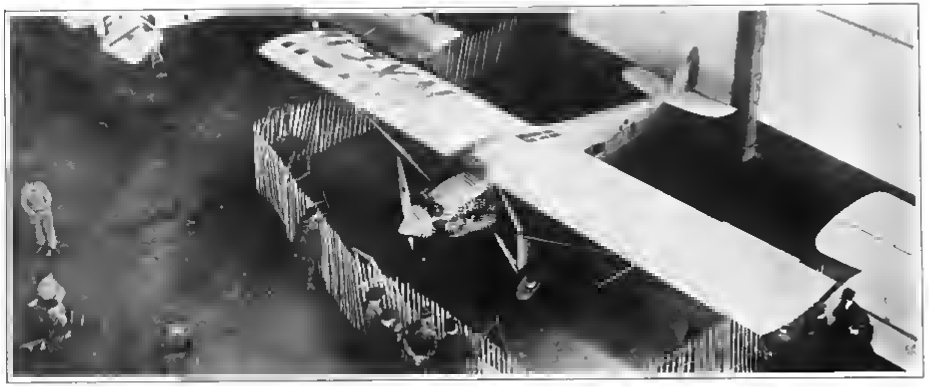
The welcome accorded him at the British field was almost equal in enthusiastic disorder to the Le Bourget episode. Over 150,000 people swarmed out onto the field as his machine glided down and in fear that serious damage would befall his beloved plane Captain Lindbergh "gave her the gun" and circled overhead until a space suitable for a safe landing was provided. The detail of policemen and the official reception committee had been swept aside by the cheering multitudes and once again it was necessary to battle a way off the field. During his stay in London Captain Lindbergh was presented to the royal head of the British empire and decorated with the Air Force Cross.

Will Go to Washington First

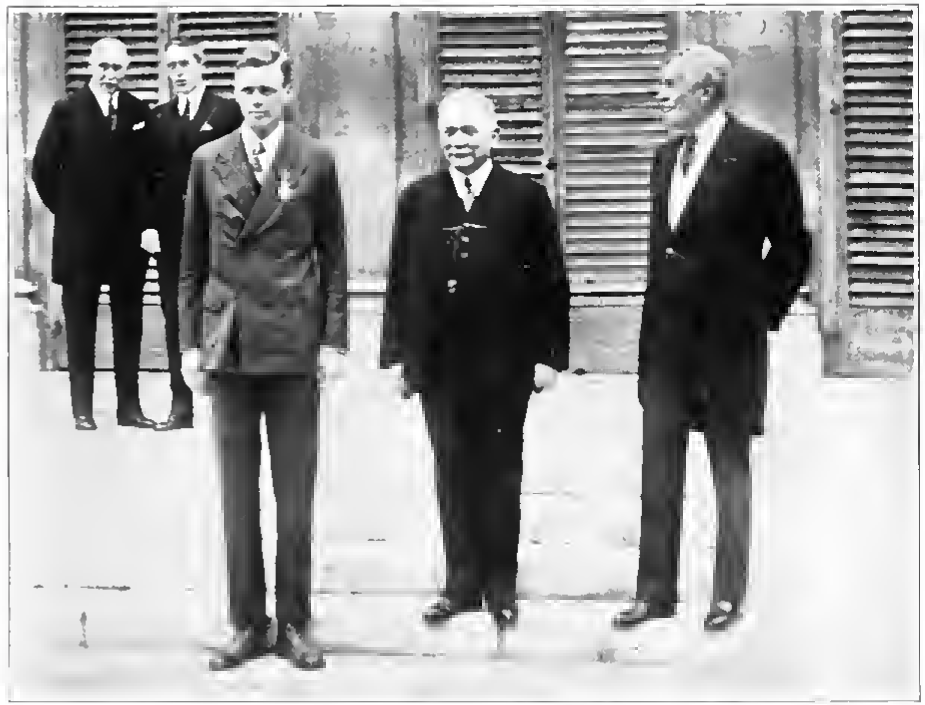
Due to a last minute request to have the air hero return direct to Washington where he will be officially welcomed by the President, New York City will not be the first to extend greetings. However, New York's reception plans will not be changed as it is expected that Captain Lindbergh will fly to Miller Field, Staten Island, on the day after his arrival at Washington, on June 13, aboard the cruiser Memphis, and be brought to the city from there.

Grover Whalen, Chairman of the city's official Committee on Receptions has announced that Fifth Avenue from Washington Square to Sixtieth Street, part of the parade route laid out for the returning hero, will be transformed into a "golden way," with a giant electric sign at its end, reading "Welcome Home, Charles A. Lindbergh." It was at first thought that the illuminated message of welcome should be placed on City Hall or on the New York Public Library building between Forty-first and Forty-second Streets, but Mr. Whalen was of the opinion that difficulty would be experienced in thus making use of public buildings.

The present plan is to erect an arch where the route dips into Central Park at Sixtieth Street. The words of welcome will be illuminated across the arch under which Capt. Lindbergh, his plane, the Spirit of St. Louis, and his escort will proceed.



Spirit of St. Louis in Hangar at Le Bourget. Acme Photo



Captain Lindbergh with President Doumergue and Ambassador Herrick. Acme Photo

Thousands to Parade

Another feature of the reception brought out yesterday was the manner in which the plane, an object of public interest overshadowed only by the young flier himself, will be transported through the streets of New York. According to Mr. Whalen measurements have been completed of some of the narrow corners on the line of march from the Battery to City Hall, thence to Lafayette Street, Ninth Street, Fifth Avenue, Central Park, and show that the wing spread of the machine, about forty six feet, would make it impossible to mount it on a single conveyance. Not only narrow street intersections but elevated railway pillars would obstruct passage of such a large machine. It has been accordingly determined to separate the fuselage and wings, taking them the length of the parade on two separate floats.

In addition to the parade and reception at City Hall for the young aviator on the day of his arrival, he will be asked to attend a dinner which, for the number of notables and others present, will rival anything of its kind hitherto known.

Dinner Arrangements Complete

Arrangements for the dinner have been completed according Mr. Whalen covering all essential details but the precise date. It will take place at the Commodore and 3,500 persons are expected to attend. Mr. Whalen will preside, introducing Mayor Walker who will act as toastmaster. President Coolidge and Governor Smith have been asked to attend, just as the President and Premier of France attended functions in the young flier's honor. Despite the number of places planned thousands of applications will have to be rejected.

If a movement started by the Chamber of Commerce of Glen Cove, L. I., is successful the day of Captain Lindbergh's arrival here will be set aside as a State Holiday. The Chamber of Commerce has sent the following message to Governor Smith:

"Recognizing in Lindbergh's recent achievement the heroic pioneer of a new American era and believing that the great State of New York should pause and manifest fitting homage to him, the exemplar of America's youth, may we respectfully request you to set aside the day of his arrival at our portals as a historical holiday?"

Lindbergh's Plane Not a Stock Model

Ryan Airlines, Inc., wish to correct erroneous newspaper reports that Captain Lindbergh's plane was a Ryan stock model. There is very little in common between the "Spirit of St. Louis" and Ryan stock models in either design, construction or external appearance. The "Spirit of St. Louis" was designed for a specific purpose. For the accomplishment of that purpose the Ryan N.Y.P. was given greater wing area and many other structural changes differing from stock models were made. These changes will be detailed by Donald A. Hall, Chief Engineer of Ryan Airlines, Inc., in the Lindbergh Welcome Home issue of AVIATION, dated June 20.

Spokane Awarded National Air Races

Spokane, Washington, has been awarded the national air races for 1927, according to an announcement made in Washington, D. C., by the National Aeronautic Association. In connection with the races, races from New York City to Spokane, a distance of 3300 miles, and from San Francisco to Spokane will be staged, with the speed races as the concluding events.

This year the cross country race will be essentially commercial, the rules providing that only standard types of commercial ships actually in production by manufacturers of aircraft, may be used. September 23 and 24 are the dates for the air races and the cross country contests will be started in New York Monday, September 19 and from San Francisco September 21. Stops will be required en route, the purpose being to establish the northern transcontinental air mail routing and to simulate actual commercial conditions where planes would be required to halt briefly to permit changes in passenger personnel and unloading and loading of express or freight.

$40,000 in Prizes

Harlan I. Peytou, president of the Spokane chapter of the National Aeronautic Association and Major John T. Fancher, commandant of the Fourth Air Service division, national guard of Washington, went to the capitol and landed the race for Spokane. Forty thousand dollars in prize money will be provided and is already in the hanks to insure payment to winning fliers. In the national air races both military and commercial ships will compete, the former for the nation's flying trophies and the latter for cash awards.

Under the plans approved by the national association, five minute stops will be required in the transcontinental race at Chicago and a full night's stop in St. Paul. On the second day each ship will start in the order of landing the day previous with the same time difference maintained. This gives the leading fliers the same advantage as they would have held had the flight been permitted to continue straight through. Five minute stops will be required at control stations at Fargo, North Dakota; Glendive, and Butte, Montana.

Commercial Planes Only

Classifications are provided for ships of 100 horsepower or less and of ships with more than 100 horsepower. In the A class for planes of 100 horsepower or under, first prize in the New York race will he $5000 for first, $3000 for second, $1000 for third, $500 for fourth, and $250 for fifth place. In the B class for higher horsepower $10,000 is provided for first money, $5000 second, $2000 third, $1000 fourth and $500 fifth. There are no bars in this contest except that the ships must be in commercial production for commercial use. One or more motors may be used. The list of events, tentatively approved, follows:

Free-for-all, civilians only, for planes with piston displacement of 800 cubic inches; prizes $2500

National Guard race, military planes only, prizes $1000.

Light commercial planes competing on speed and efficiency ratings, civilians only, for cash prizes of $2500 and the trophy of the Aviation Town and Country Club of Detroit.

Trophy race, civilians only, for planes of 510 cubic inches piston displacement, for cash prizes of $2000

Race for military observation planes, for the Liberty engine builders' trophy.

Large capacity military airplanes, for trophies.

Race for pursuit type planes, for the John L. Mitchell trophy.

Air transport speed and efficiency races, civilians only, for the Detroit News trophy and prizes of $2500

Free-for-all pursuit race, military men only, for the Kansas City Rotary Club trophy.

In the San Francisco-Spokane race, one five minute stop at Vancouver, Wash., will be the only one required. It is approximately a 1100 mile journey. The longer route is approximately 3300 miles.

For the San Francisco-Spokane race, smaller horsepower ships will win $1000 for first place, $500 for second, $250 for third, $150 for fourth and $100 for fifth place, while ships of more than 100 horsepower are $1500 for first, $1000 for second and $500 for third. Same rules apply. Parkwater Field, Spokane's municipal airport, one mile long and one-half mile wide, will be used.

More complete details, when arranged, will he made public through the columns of AVIATION.

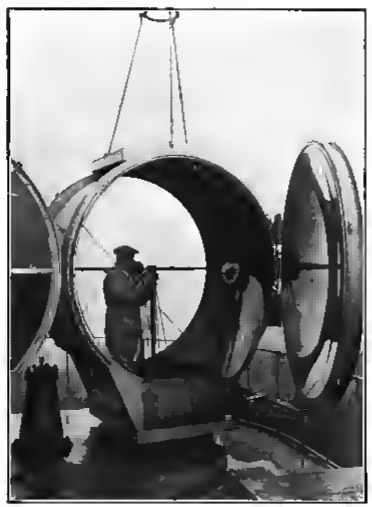
Daniel Guggenheim Aids Nungesser Search

Announcement has been made of a gift of $25,000 by Daniel Guggenheim of the Guggenheim Foundation for the Promotion of Aeronautics, to defray the expenses of an intensive search of Newfoundland for Captain Nungesser and Major Coli, the missing French airmen who attempted to make the Paris to New York hop four weeks ago and who have not been heard from since. Mr. Guggenheim said that he had donated the money because he considered the search "America's job." The search will be commenced as soon as final preparations are completed, and will be made from the air by experienced pilots who are familar with the territory.

Bids Unnecessary for Extra Stop

The Postmaster General, Harry S. New, may designate Asheville, N.C., as an additional stop on the proposed contract air mail route between Atlanta, Ga., and New York City, without readvertising for new bids, the Comptroller General of the United States, J. R. McCarl, announced May 19.

In making this announcement, Mr. McCarl said that the "stop" must be in the interest of the Government, and also providing the present contractor on the Atlanta-New York City route agrees to serve the additional "60 miles from Spartanburg to Asheville by a 'feeder' plane as a part of and an additional stop on the regular route."



The B.E.T. revolving beacon at Mount Valerien which marked the approach to Le Bourget Airport for Captain Lindbergh on his historic Atlantic Flight. The light, which is 6 ft. 6 in. in diameter, develops a beam of a thousand million candlepower and can be seen 90 miles in a clear sky.

Chicago, The Air Transport Center

Six Airlines Now Operating Inspire Further Municipal Cooperation

By EARL D. OSBORN

WHILE OTHER cities vie with each other to become the center of the aircraft manufacturing industry Chicago has, through force of circumstance, become the air transportation center of the United States. The first event to contribute towards this end was the routing of the government Transcontinental Air Mail through Chicago. Then came the letting of air mail contracts to private air transport companies which would feed mail to the Transcontinental route. As a result, there are now six airlines operating from Chicago, and the city has become the hub of air transport in the United States.

The value of these airlines to the residents of Chicago is great. It means more than ever that the city will become the business center of the country. The city authorities are beginning to realize this and have provided a fine municipal airport and are planning another on the lake front. Little encouragement, however, has been given to the airlines to use the city as the base for their operating and maintenance work. The government Air Mail headquarters, it is true, are at Maywood, on Federal property, but this site shortly will be abandoned. The National Air Transport have their main office in Chicago, but the motor overhaul was done at St. Joseph, and the plane overhaul was done at Kansas City until the hangar burnt down. The Ford Air Transport, naturally, has its base at Detroit. The Roberston Aircraft Corporation has its base at St. Louis, and Contract Air Mail Route No. 9, though originally based at Chicago is now operated by the Northwest Airways and has its base at St. Paul. When the government turns over the Transcontinental air route to private operators, the N.A.T., will probably be the only one of the six air lines with headquarters at Chicago.

Aircraft Manufacture in Chicago

With one exception very little Chicago capital seems to be invested in the air lines which converge at the city and the Chicago business men do not seem to have realized the possibilities in aviation.

Though several men well known in aeronautical circles are located in Chicago no manufacturing on a large scale has been attempted as yet. E. M. Laird is one of the most favorably known commercial designers in the country. He has a fine large factory located right on the flying field. Mr. Laird has had long experience in matters aeronautical and manufactures excellent airplanes. Several of his planes were used by Charles Dickinson on the Air Mail line to St. Paul. During the period of operation of the line the Laird plane flew an extraordinarily high mileage in a very short time. Mr. Laird is now at work tooling up for the construction of a less expensive plane which will be powered with an OX-5 engine, but will also continue the manufacture of the Whirlwind three-place type plane.

Mr. E. B. Heath of the Heath Airplane Co., has become well known in the development of aeronautics for his many years of pioneering work and his enthusiasm for light planes, as well as his opposition to Federal legislation. His shop is located in the city and contains everything from piston rings to wing beams. Doping, welding and engine overhaul all go on in the same room. Mr. Heath's activities also extend to the running of a school and a flying field. The single-seater light plane which Mr. Heath is building for the Ford Tour is nearing completion and appears to be a very interesting job. The wings are very carefully made, but due to the small size of the plane the members are all very light. The fuselage, which is approximately the same as that on the production type of light plane, is constructed with steel tubing, but instead of being welded together, the tubes are fastened by a most ingenious and simple set of fittings. Any careful mechanic should be able to build a plane according to the blue prints which are for sale.

If a foreigner wanted to find out how America had developed aerial service and made it pay while other countries had failed, he could not do better than to visit the Yackey Aircraft Company and also Checkerboard field. Tony, as the owner, W. A. Yackey is universally known, does a little of everything. He flies, he buys and sells aeronautical material, he builds planes and he talks, and he does all of these things well and incidentally makes money. The energy and resourcefulness required to make a success of aerial service and the merchandising of aeronautical equipment are very considerable, but such men as Tony Yackey have proved that it could he done and they have kept commercial aviation alive in this country through a very trying period. At present, Yackey, besides his other activities, is building several monoplanes to he powered with Wright Whirlwind engines.

Chicago Flying Activities

There are over a dozen flying fields in the outlying suburbs around Chicago, but only five of them were visited. There had been a great wind and a terrific hail storm the week before and remnants of planes seemed scattered all around the countryside. The planes which were left outside and which had not been blown away, were ruined by the hail which went right through the wings and fuselage. The tent hangers at Ashburn Field were blown down.

Among the most active of the newer aerial service companies is the Chicago Aeronautical Service which, though in operation only about a year, have had three hundred students enrolled for their course of training. Mr. J. Klepha is the president, J. R. Stiles, general manager and Edgar E. La Parle, chief pilot.

Chicago Aeronautical Mexican Class

The Chicago Aeronautical Service, of Chicago, Ill., has a class of twelve Mexican students. In order to meet the demands of such an undertaking, the complete theory course was translated into Spanish for the use of this class.

At present the school has 322 students enrolled for training, the instruction being given in Waco planes. Every

Chicago Aeronautical Company's class of Mexican students.

Sunday an exhibition parachute jump is made at the company's field by Loren D. Mitchell.

This company has instituted a daily passenger service between Chicago and Milwaukee, with Waco planes.

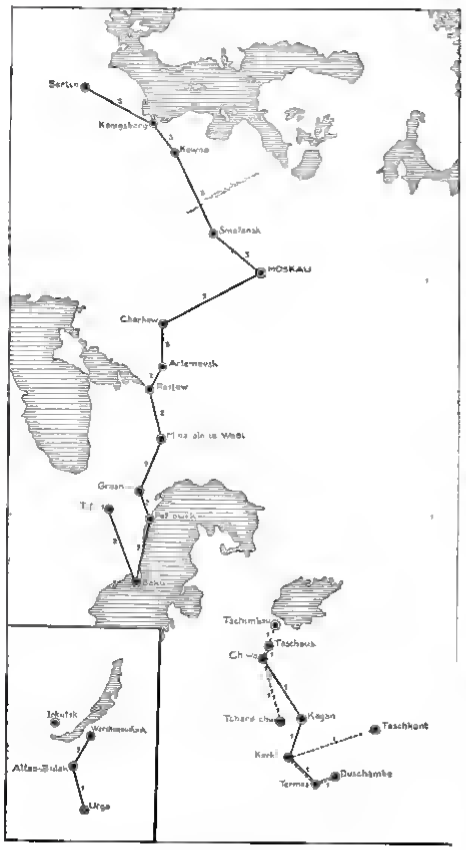
Commercial Aviation in Russia Expands

Regular Airlines of the Soviet Republic Increasing Business Each Year With Remarkably Few Accidents

THE FOLLOWING authentic information regarding the commercial airlines in Russia has been received from W. Wishneff, Inspector of Civil Aeronautics in Russia. It shows the expansion of air transport in the Soviet Republic and indicates that aerial service is also on the increase.

The following airlines were flown regularly during 1926:

Company	Route	Length
Deruluft	Moscow Koenigsberg	750 miles
Oukrvosduchput	Moscow Cherkoff-Rostoff-Mineralnye Wody Baku Tiflis	1,615 miles
Dobrolot	Kagan (Bukhara)-Chiva Tashaus	334 miles
	Kagan-Duschambe	456 miles
	Werchneudinsk Urga	379 miles
		3,726 miles



Map diagram of Russian Airlines.
(1) Dobrolot, (2) Oukrvosduchput, (3) Deruluft.

The Moscow to Koenigsberg and the Moscow to Mineralnye Wody lines were flown daily during the summer months. The Mineralnye Wody to Baku to Tiflis route was flown three times a week. The Central Asiatic lines maintained a four times a week schedule throughout the year except for short periods during the months of December and February, and the Mongolian route was flown twice a week from March until October, and occasionally during the other months.

The following are regular airline statistics for 1926:

Company	Trips	Distance	Passengers	Freight & Mail
Deruluft	315	235,000 miles	444	58,228 lb.
Oukrvosduchput	550	255,625 miles	1,372	53,246 lb.
Dobrolot	878	329,375 miles	2,219	74,560 lb.
Total	1,741	820,000 miles	4,035	186,034 lb.

Other aerial operations such as joy-rides, survey, locust dusting, etc., conducted by the three companies and the Aviachim (National Aviation Society) in the year of 1926 amount to 3,575 flights for a distance flown of 162,500 miles, carrying 3,452 passengers. The grand total of civil aviation in the Soviet Republic during the year of 1926 amounts to 5,316 flights, 982,500 miles flown and 12,487 passengers carried.

A yearly comparison of the performance of the regular airlines shows a steady growth since 1924:

	1924	1925	1926
Miles flown	358,125	658,750	820,000
Passengers	2,816	3,398	4,035
Freight and mail	105,600 lb.	127,200 lb.	186,034 lb.

The number of fatal accidents on the Soviet Republic airlines have been remarkably few. During the year of 1925 no persons were killed and only two were injured, and in 1926 there was just one accident and only two persons killed. A ratio of one accident for every 937,500 miles flown. On the Asiatic airlines of the Dobrolot, which is forced to operate under difficult conditions, more then 625,000 miles were flown without a single injury among the passengers or crew.

The other branches of aviation, which include surveys, locust dusting in the North Caucasus, forest dusting and observation flights over the White Sea in search of seals show marked progress, especially during 1926 which was a very successful year for the work. This year the work is being conducted on an enlarged scale. Locust dusting was done over 980 hectars in 1925 and 10,000 hectars in 1926. Forest dusting of 700 hectars over woods of the Nishny-Novgorod district was made with good results and during the coming season plans will be put into operation to dust some 25-30,000 hectars of otherwise inaccessible lands that are infested with locusts.

Airways Now Lighted for 1,386 Miles

In a report by Air Secretary MacCracken of the Department of Commerce, announcement is made that the aeronautical branch has completed 1,386 miles of lighting on airways and is working on other routes so that a night schedule as well as a day schedule may be maintained. Forty-five immediate fields have been established, 109 beacons and seventy-three blinker lights between municipal airports. Installation is underway of radio directive beacons at strategic points to guide pilots under conditions of low visibility.

It is estimated that by the end of the current year the airway system of the United States will have been increased to 9,435 miles and will serve eighty-two cities with a combined population of almost 24,000,000 in addition to numerous cities which benefit by rapid railroad connections with airway stops. At that time also, over 7,000 miles of airways will have been lighted for night flying or will be nearing completion of lighting installation.

Fifteen Balloons Compete in Elimination Race

After a short delay caused by an electrical storm fifteen balloons took the air in the late afternoon of Memorial Day at Akron, O., for the start of the national elimination balloon race. The three pilots making the longest course will be eligible to compete at the international race to be held at Denver, September tenth.

The first balloon took the air at 5:01. It was the United States Army balloon of Scott Field, Belleville, Ill., and was piloted by Lieut. James Powell with Major Maurice R. Smith as aide. The Army No. 2 was followed five minutes later by the United States Navy balloon No. 3, Lakehurst, N. J. In the basket were Lieut. James Charles E. Bauch as pilot and Lieut. F. R. Reichelder as aide. Captain Harry E. Honeywell pilot of the St. Louis Rotary Club entry, was the next to leave the ground. With him as aide was Roderick H. Tait, Jr. Honeywell's old green varnished balloon was followed by No. 1 entry of the Detroit Flying Club with Pilot Charles O. Williams, Jr., and Dr. George M. Legalee, his aide aboard.

Ward T. Van Orman, national champion of 1926, was next in the Goodyear Tire and Rubber Company balloon. W. W. Morton was Van Orman's aide. The silk bag shot into the air swiftly and veered off toward the north. Detroit Flying Club balloon No. 2 rose in the air from sixth position. It was piloted by Sved A. U. Rasmussen, W. A. Klickoff was aide. Navy No. 2, composed of Lieut. G. V. Whittle, pilot, and Chief Rigger Franklin E. Masters, aide, got away five minutes later. The second Navy team was not prepared to start on scheduled time. Army No. 1 left in its place, piloted by Lieut. Paul Evert with Lieut. R. R. Gillespie as aide.

Detroit No. 3, piloted by E. J. Hill, was the next to take off. A. G. Schosser was aide. Capt. William E. Kenper, piloting the Army Balloon No. 3 followed. With him was Lieut. William C. Eareckson. The balloonists carried their collapsible boats suspended from the rigging. The last Army Balloon No. 4, from Norton Field, Columbus, was next. Lieut. Frank M. McKee was pilot and Capt. Samual T. Moore was his aide.

Pilot Jack Boettner and his aide, J. F. Cooper, soared away in the Schipps-Howard balloon at 5:50. The Davey Tree Expert Company entry from Kent, O., left three minutes later. Robert P. Lehr was pilot and Charles H. Roth was aide. The last of the naval balloon teams, No. 1, of Lakehurst, was the next to take off. It was piloted by Lieut. T.G.W. Settle, with Chief Boatswain's Mate George N. Steelman as aide. The Akron Beacon Journal balloon, the last to leave the ground, took the air at 5:55, exactly twenty minutes ahead of schedule.

Flight To India Terminates

Although keen disappointment was felt in British aviation circles over the termination about forty miles from Bender Abbas, near the Persian Gulf, of the attempted non-stop flight of Lieuts. C. R. Carr and L. S. M. Gillman, of the Royal Air Force, their performance is considered highly creditable.

Leaving Cranley, near London, Eng., on Friday, May 20, the fliers started on what they hoped would be a non-stop flight from London to Karachi, India, a distance of 4,000 mi. The news of their mishap was received in a dispatch from Karachi to the Air Ministry, and no details were given. They were rescued by a passing steamer. Their plane was lost and the fliers continued to Abadan. It is thought that they had to make a forced landing across the Bend at the entrance to the Persian Gulf on a straight course to Jask, 100 mi. ahead. Another hour of flying would have enabled them to glide to the Jask Aerodrome, 3,600 mi. from Cranwell. The plane had been in the air about 32 hr.

Two hours after the start of the flight, the fliers were reported over Ostend. The plane used in the flight was a special Hawker-Horsley bomber, powered with Rolls Royce-Condor, 650 hp., engine. The tanks carried 1,100 gal. of gasoline.

Flood Light Tests at Anacostia

Practical tests of the B. B. T., Sperry and General Electric airport flood lights were made at Anacostia, D.C. on the evening of May 11. Five pilots made twenty-six landings under very unfavorable conditions, with a fresh cross wind, landing practically directly into the light and approaching over unlighted obstacles. No trouble was experienced on any of the landings.

A few worth-while experiments in the operation of the B.B.T. light were tried out. As the pilot taxied back to the line, a narrow board was held in front of the light to throw the edge of its shadow on the pilot. A very sharp and well defined shadow was made. This took the glare out of the pilots eyes without unduly darkening the surface of the field and was pronounced an unqualified success.

Two landings were made directly toward the B.B.T. light. In each case the pilot experienced no trouble whatever from the glare of the light as he landed, as during the approach the wind shield threw out the glare and after levelling off, the engine of the UO, in which the flying was done, took all the strain off the pilots eyes and left the field well lighted.

Landings with the light astern are, however, to be recommended rather then those with the light ahead.

Lindbergh Well Represented Here

The press arrangements in connection with the return of Captain Charles Lindbergh have been placed in the hands of Harry Bruno and Dick Blythe, public relations counsel for many aviation firms.

This announcement was made by Grover A. Whalen, chairman of Mayor Walker's Reception Committee to Distinguished Guests, after a conference with B. Franklin Mahoney, president of the Ryan Airlines, Inc., and personal representative for Captain Lindbergh.

Harry Bruno and Dick Blythe handled all press arrangements from the time Captain Lindbergh landed in New York City until he took off to Paris. Great credit is due them for the able manner in which they carried through this work.

Royal Air Force To Hold Display

The eighth Royal Air Force display will take place on Saturday, July 2, at Hendon Airdrome, England. The program of this annual display, which is an integral and important part of the training of the Royal Air Force, has been arranged to demonstrate the efficiency and the airmanship of service squadrons. New features are being introduced which will enable the public to appreciate the developments that are constantly taking place in the air, while events that have proved popular in the past are being retained or revived.

As a result of the purchase of the Hendon aerodrome by the British Air Ministry last year, arrangements have been made to improve its accommodation and traffic facilities. In addition to road improvements a grand stand with a seating capacity of 3,000 is in the course of construction. The proceeds will be devoted as in the past, to Royal Air Force charities.

Luft Hansa Station Keeps Air Traffic Record

In order to determine what class of people, according to occupations, use the commercial air service, the Luft Hansa Station at Frankfort on the Maine has kept a record covering a period of nine months. It finds that merchants, manufacturers, and corporation directors, constitute thirty-six per cent of the passengers carried. Other occupations are represented by the following percentages: Engineers, Architects, Builders & Artisans, 8%; Physicians, Chemists & Druggists, 4.5%; Active & Retired Military Personages, 4.5%; National & State Officials, 3.5%; Jurists, Lawyers, etc., 3%; Artists & Actors, 2.5%; Authors, Publishers & Journalists, 2%; Bankers, Bank Directors, 1.5%; Country Gentry, 1.5%; Undetermined Occupations, 33%.

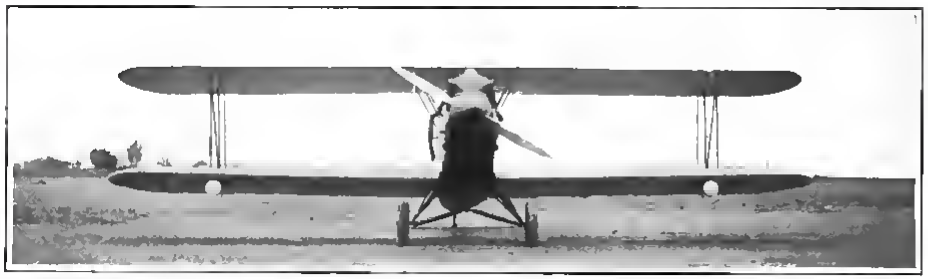
Elias Company Builds New Commercial Plane

Approved by the Department of Commerce and Powered with a 400 hp. Liberty 12-A Engine

A NEW COMMERCIAL airplane, the Airmobile, has recently been produced by G. Elias & Bro., Inc., of Buffalo, N. Y. This company is developing several types of commercial airplanes and a small air-cooled 65 hp. engine of their own design.

One of the new airplanes was sold to Harry S. Hilliker of the Buffalo Chamber of Commerce, who is a pilot and an ardent aeronautical enthusiast. Mr. Hilliker uses the plane for business as well as pleasure trips. The flight tests were made early in March at Buffalo Airport and the performance has amply justified the expectations of the manufacturers.

The design, which has been approved by the Department of Commerce, is of the single-bay biplane type, powered with a 400 hp Liberty 12 A engine, and has a high speed of about 150 m.p.h. It is the outgrowth of previous experience gained by building various types of military and commercial planes, notably the M-1 mail plane, the similarity to which is noticeable from the photographs. The pay load carried by the new airplanes consists of two passengers and baggage, or else 700 lb. of express, with a cruising range of 800 miles. With a somewhat reduced fuel load and cruising range 1000 lb. of pay load may be carried. Being especially adapted to flights of greater than average distance at high speed, it is well suited for air mail and express lines as well as passenger carrying. The most modern practices are adhered to in the design and construction which incorporate many novel features.



Front view of the new Elias "Airmobile."

Fuselage

The fuselage is built of welded steel tubing of warren truss construction throughout, thus eliminating all wire bracing and the necessity of periodical adjustment. The pilot and passengers are comfortably seated in large, roomy cockpits having deep cushions comparable with the best automobile practice. The cockpits have a removable lining, the double walls preventing draughts and eliminating wear on structural members, and provision is made for heating both cockpits. The cowling at the passenger cockpit is interchangeable with cowling incorporating a cover which may be locked when mail or express is carried. Non-slip walkways 18 in. wide are provided on the lower wings besides the fuselage, the marked boundary of the walk being 12 in. wide and thus no damage is done if one accidentally oversteps the mark.

Ample baggage space is provided in a large compartment aft of the pilot's seat and another at the front seat, thus eliminating crowding of the passenger cockpit. The whole afterdeck is hinged for access to the baggage compartment and ready inspection of the interior of the fuselage. On each side of the pilot's seat is a compartment of about 1 cubic foot capacity having a hinged cover, for storage of the pilot's personal effects. Both cockpits are well protected from the air stream by large celluloid windshields, and the cowling under the pilot's windshield is cut away to improve the lighting of the instrument board. Complete lighting equipment is installed for night flying.

Controls

The pilot's seat is adjustable vertically and the rudder bar is adjustable fore and aft a distance of 6 in. to accommodate pilots of various statures. There are no pulleys in the whole control system, all bearings are hardened and ground to very close limits, and all lost motion is carefully eliminated. All control surfaces are of the unbalanced type, and the stabilizer and fin are adjustable.

Wings

The CYH airfoil section is employed. This section, which was developed by the National Advisory Committee for Aeronautics, is a modification of the Clark Y section, having a slight upward curvature near the trailing edge. While retaining high lift and high efficiency characteristics, this airfoil has a practically stationary center of pressure, thus improving the longitudinal stability and reducing the stresses in the wing structure. This is probably the first airplane to be built using this wing section.

The wings, consisting of a center section and four outer panels, are built up of box spars having plywood webs and spruce flanges, and ribs of plywood and spruce construction. Interplane and center section struts of the N type are of streamline section steel tubing. The landing wires and double flying wires are streamline tie rods.

Power Plant

The Liberty engine turns a Curtiss-Reed type R forged duralumin propeller. The engine cowling fairs into a streamline nose spinner on the propeller hub. The top cowl is hinged to give instant access to the engine, and the entire engine cowling is removable in 5 min. An underslung radiator of the tunnel type is located under the forward end of the engine, and is neatly cowled in as shown in the photographs. The engine mount and the entire power plant, except the fuel system, are removable as a unit from the fuselage by removing four bolts. The engine alone can be removed without affecting the radiator or oil tank, and each of the latter can be removed independently. A 50 gal. gasoline tank located in the center section provides simple and reliable gravity feed, and a 75 gal. tank under the passenger cockpit floor can be made droppable if desired. The piping from the center section tank passes through two of the streamline tube center section struts, thus protecting it from accidental damage and eliminating its air resistance.

Landing Gear

The landing chassis, of streamline steel tubing, is of the divided type having a wide tread, and employs oleo pneumatic shock absorbers of a new design. In this shock absorber the static weight of the airplane is supported by air pressure, the dynamic load of impact is absorbed by the oil cylinder and air pressure combined, and the rebound due to the air pressure is checked by the oil cylinder. The tail skid, also of steel tubing, has a similar shock absorber. Wheel brakes are provided at additional cost, if desired. The flight tests demonstrated the smooth taxiing qualities of this landing gear, and the complete lack of rebound in landing.

The manufacturers specifications and performance figures are as follows:

Span, upper and lower wings	40 ft. 3 in
Chord, " "	60 in
Gap	72 in
Stagger	none
Wing Area	435 sq. ft.
Airfoil	CYH
Dihedral, upper wing	none
Dihedral lower wing	1½ degrees
Tread of landing gear	84 in
Engine, Liberty 12 A	400 h.p.
Weight empty	2260 lb.
Weight, loaded	3810 lb.
Fuel capacity	125 gal.
Cruising range	800 mi.
Maximum speed	150 m.p.h.
Landing speed	53.3 m.p.h.

Rear three quarter view of the "Airmobile"

Board To Examine Airship Designs

Secretary of the Navy Curtis D. Wilbur appointed a board to examine the designs for a new rigid airship, of approximately 6,000,000 cu. ft. capacity, which are being submitted to the Navy on a competitive basis. The board is composed of the following officers:

Rear Admiral William A. Moffett, chief of the Bureau of Aeronautics. Comdr. S. M. Kraus, Material Division, Aeronautics. Lt. Comdr. R. G. Pennoyer, Bureau of Aeronautics. Lt. Comdr. C. H. Havill, Bureau of Aeronautics. Lieut. Roland Meyer, Construction Corps, Lakehurst, N. J.

Side view of the "Airmobile."

Night Flying Equipment for the Airdrome. III

A Parallel Distribution System

By WILBUR T. HARDING*

THE PREVIOUS discussions of the general subject of night flying equipment for the airdrome have considered each item of equipment by itself, with little or no attempt to describe the electric system necessary for the operation of the complete installation. This has purposely been avoided until the various units could be presented and the requisites of each discussed. Once a decision is made as

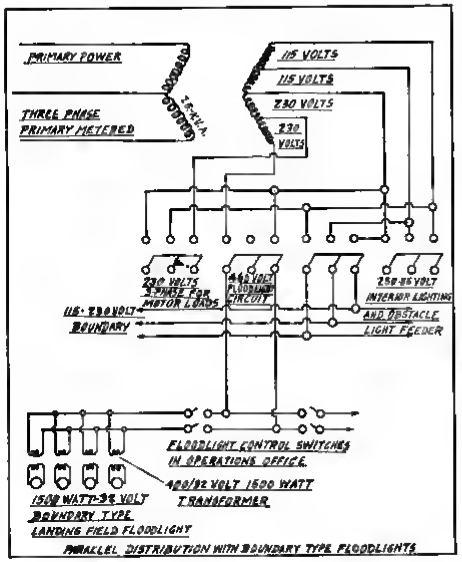


Fig. 20.

to what equipment will be used then this new problem can be attacked, as the distribution system is entirely dependant upon what is used. The selection of proper equipment for airdrome is an important problem but the design and installation of an electrical distribution system is equally as important if not more so. As a general rule, the equipment will not cost as much as the distribution system on which it operates. Again the success of the entire installation depends upon the manner in which it is installed.

It is assumed that alternating electrical energy, supplied at a commerical primary voltage and frequency, is available for lighting the airdrome. For certain classes of airdromes particularly those with small landing fields and few obstacles, a parallel distribution system can be installed at a reasonable cost. This system is the three wire, 230-115 volt arrangement used extensively in nearly all lighting systems and consists of a single phase transformer, with the secondary coils arranged to give 230 volts between outside wires or 115 volts from either outside wire to the mid-tap, or middle wire.

Map of Airdrome and Surroundings

The first step is to secure, or make a map of the airdrome to scale. For the majority of airdromes a convenient scale to use is one inch equals 200 ft. The map should show the boundary of the landing area, and sufficient adjacent territory to locate adjacent obstacles. Buildings on and adjacent to the airdrome should be located, upon a print of this outline map, for field notes, the various obstacles and their approximate heights should be located. For communication and electric lines, each pole should be located. Trees which cannot be removed should also be shown. The maximum height of all buildings should also be determined approximately. If electric energy is available at the field the method of service, voltage and frequency should be accurately determined and all transformers shown. If energy is not available the power company should be consulted as to feasible methods of supplying service. In such a case, before any actual construction is started by the Power Company a central point of control and distribution should be decided upon.

Floodlight Control Desirable

To select and use a central point may not be feasible or practical as it is usually desirable to have floodlight control, especially in the main hangar or in the operations office. In general, the transformers and control should be located at the load center of the system to be lighted. This is accomplished when the loads supplied by the different feeders, times their respective average distances of transmission to the loads, are equal. For landing field floodlights, if boundary type units are used, since the electrical loads on the two rows are equal, the feeders to each should be equal. For hangar floodlights arranged equally distant along a hangar line, the control should be such that the loads in two directions are equal. Boundary and obstacle lights should be treated likewise. By considering each load separately it will be seen that each of the above loads has a load center. Consideration of all these loads and load centers will determine

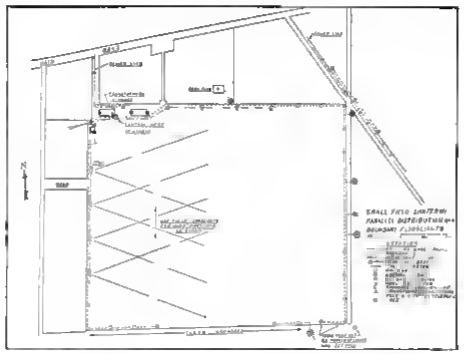


Fig. 21.

the place to locate the transformers and control to secure the best distribution and most economical installation.

Once the point of control has been decided steps may be taken to have the primary serving the airdrome extended. This should be done overhead in a manner not to create an obstacle or hazard to a point as close as possible to this central point as practical. From there on it is advisable to go underground to a small transformer house which may be erected adjacent to the control point. The primary extension should be three phase in order to allow the use of motors

*Electrical Engineer, McCook Field, Dayton, Ohio in charge of the development of Night Flying Equipment for the U. S. Army, Air Corps.

for gasoline pumps and machine shop from the same system if so desired later. For extending the primary underground Parkway cable, designed for that primary voltage, terminating in desirable pot heads, is satisfactory.

May Use Two Transformers

The transformer installation and distribution is dependent upon the type of landing field floodlights that are to be used. If two rows of boundary type floodlights are to be used it will be necessary to supply two transformers. One should have

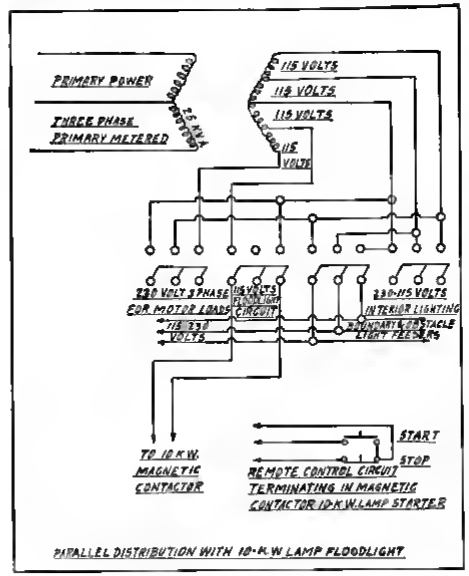


Fig. 22

a secondary rating of 230-115 volts and a capacity to handle all boundary lights, obstacle lights, hangar floodlights, angle reflector, wind tee, and the revolving beacon. If no other provision is made for interior hangar lights additional capacity should be supplied. Separate interior lighting distribution circuits should be supplied which are not considered in this discussion except to state that it is not advisable to use the boundary light circuit for inside hangar lighting as the same would not be in operation during the day. Another transformer with a secondary rating of 460-230 volts and a capacity of at least 7.5 KVA should be supplied for the landing field floodlights assuming that only one row of four floodlights, each using a 1500 watt lamp, is to be operated at a given time. The two transformers may be connected as shown by Figure 20. The primaries are connected in open delta. An open delta is supplied in the secondary by using one coil of the 460-230 volt transformer as one leg and both coils of the 230-115 volt transformer as the other leg. This arrangement allows 230 volt, 3 phase for motors, 460 volt single phase for landing field floodlights, and 230-115 volt single phase for airdrome lighting and interior hangar lighting.

Lighting Circuit Underground

For the above arrangement a small switchboard should be supplied with four 30 ampere, 250 volt, 3 pole fused knife switches, back connected, mounted thereon and the connections made as shown. The landing field floodlight circuit should go underground with Parkway 600 volt, two conductor cable, to the operations office or other convenient point of control at which point two 30 ampere, 600 volt enclosed switches should be used for controlling the two floodlight feeders. Two conductor, 600 volt, Parkway cable buried in a shallow trench, should be used for the floodlight feeders, with a size to supply 6 KW at 460 volts at the floodlights. At each floodlight a 460/32 volt dry type transformer should be connected to this circuit. BXL cable should be used from transformer to lamp. A convenient method of protecting splices and transformer is to place the same in a steel box and cover with compound. This will also eliminate the use of wiped lead joints. The floodlight can be mounted at the desired height upon a pipe standard set in a concrete base. The two feeders for the boundary and obstacle light circuits should be of Parkway, 3 conductor, 600 volt cable of a size to maintain at least 105 volts at the farthest lamp. This cable may be laid directly in the ground in the same trench as the floodlight feeders and various taps made with Parkway or BXL cable. These taps may be protected with an underground split tee box filled with compound, and wiped joints eliminated. Boundary lights, obstacle lights and wind direction indicator should be connected directly to this circuit. Hangar floodlights should each have an individual switch. One switch should control all angle reflector lights on the operations office. The rotating beacon should be controlled by a separate switch.

Changes May Be Necessary

To illustrate how a small field would be lighted using a parallel distribution system and boundary type floodlights, Figure 21 was prepared. A study of the system will show how an application is made of the parallel distribution. The transformer connections would be as shown by Figure 20.

In case a floodlight installation is to be one which uses a 10 KW lamp, then the transformer installation and the distribution would be changed. Figure 22 shows the changed arrangement. Instead of the 7.5 KW, 460-230 volt secondary transformer it will be necessary to use instead a 25 KVA, 230-115 volt transformer if a 3 phase, 230 circuit is desired. Parkway 600 volt, 2 conductor cable is used to the magnetic contactor installed at the lamp. The size should be such as to give 110 volts at the lamp with a 10 KW load. A control circuit of No. 12 Parkway cable, 600 volt, three conductor, is necessary and should terminate in the desired control point.

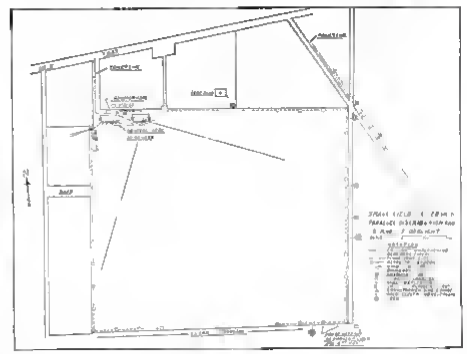


Fig. 23

Figure 23 shows the total installation made for the same field as considered previously. The distribution and transformer installation would be made as shown by Figure 23. The difference in the two installations is entirely in floodlighting and, in answer to which system is preferable, the one shown by Figure 21 is considered to be so for reasons mentioned previously.

The Schneider Trophy

Is Air Racing Internationally Worth While And If So What Are We Going To Do About It?

By Lieut. Comdr. F. W. WEAD, USN.

IT CANNOT be said that, regardless of how much we were forced to admire Italy's victory in the 1926 Schneider Trophy Contest at Norfolk, we liked it, and it might be remarked in all truthfulness that a number of individuals have spoken their dislike and criticism in no uncertain words. As far west as California and as long after the vent as March, newspapers condemned our defeat and subsequent failure to enter a Naval team for 1927. The whole thing has placed us in the attitude of the small boy who did not want to lose.

The Bureau of Aeronautics asked for funds with which to construct entries for this year's race. They were refused. Anyone will admit the futility of sending last year's racers to Italy, so that this refusal let the Navy out. As a result, it has been hinted that Naval pilots are not fit to represent the nation in the Schneider Trophy Contest—a fair, fat, logical conclusion!

It has also been stated that 'It might be said that we have (by Italy's victory) been beaten at our own game', and, after Lieutenant Rittenhouse won the Trophy at Cowes in 1923,

The Jacques Schneider Maritime Cup

C. G. Grey intimated in *The Aeroplane* that it had been 'a victory of our Navy over English individuals'. There is some truth in his intimation, but let it by no means be concluded that the United States introduced Naval competition into the Schneider Trophy Contest. In 1923, the French team was as purely naval as our own, and two of their entries, the Lathams, were, at least, built to naval order especially for the race. A French cruiser or gunboat transported personnel and planes to Cowes; the French pilots were officers of their Naval Air Service, and, when one of their planes was wrecked on the channel coast of the Isle of Wight, M. Latham informed me personally that 'He should worry', as the French Navy had paid for the plane, and owned the engines. It is also understood that, prior to 1923, French and Italian efforts had each year been entirely or in part financed and sponsored by Government agencies, and evidently England learned a lesson at Cowes, as their 1925 expedition to Baltimore was backed by the Air Ministry, and the 1925 and 1926 Italian teams were purely service affairs.

In England, moreover, a peculiar situation exists as regards the aircraft industry. Each aircraft manufacturer employs or has strings on an expert and well-known pilot, who carries out all test work—which is done by Service pilots here—and who enters various competitions with an airplane built by his company. In some instances entries are made by private individuals as a sporting proposition. The Hawker Trans-Atlantic flight, MacClaren's Around-the-World attempt, Sir Ross Kieth's and Sir Alan Cobham's spectacular tours, the entries in the King's Cup Race, and similar events are invariably financed in England by the industry and by private individuals. When such expenses are prorated among the manufacturers of the airplane, engine, instruments, wires, dope, fuel, oil, and the like, the charges against their respective advertising appropriations are not excessive. English companies invariably make much advertising out of any startling aircraft achievement.

In 1922, Hubert Scott-Paine, then the power behind the Supermarine Aviation Works, Ltd., built the Sea Lion 2d, and, with Captain Baird as pilot, won the Schneider Trophy at Venice from France and Italy entirely at his own expense, and with no help whatsoever from the Royal Aero Club or the Air Ministry; while any estimate of the cost of such a procedure would be merely a guess, it is doubted that $75,000 would much more than cover all expenses. Mr. Scott-Paine is a sportsman of the first water, and is vitally interested in aviation. We have plenty of wealthy sportsmen, and plenty of people interested in aviation, but they do not seem to be the same people.

Would Start Racers Together

If it were possible and the difficulties may be more imaginary than real—to start all entries in an airplane race simultaneously, so that the spectators would experience the thrill of competition which is the primary appeal of all types of racing, the Schneider Trophy Contest would gain immeasurably in popularity with no loss in value from a technical standpoint. As it is, if our entries are to rely upon private backing, we badly need a few "Scott-Paines."

The Army and the Navy have both spent plenty of money on their racing programs, and it is only those individuals who are closely connected with aviation who can begin to realize the tremendous stimulus and direct benefit which Service aircraft and engine design have received therefrom. Dollar for dollar that money has been infinitely more wisely expended than many other Government appropriations.

In the Schneider Trophy Contest, moreover, an immeasurable quantity, international prestige, plays its part. It is difficult to gauge, and to some individuals it may appear odd that an airplane race can possibly affect the regard and respect that nations have for one another, but it unquestionably exists. In addition, closer association with foreign nations, their designers and pilots, and observation of and competition against their aircraft and engines have their value, and can best be obtained, as far as aviation is concerned, through annual participation in the Schneider Race.

The squabble over selection of a third pilot and the subsequent crash of one of our entries at Norfolk also caused much comment. This crash did not mean a thing, as the plane in question on its best day—and it had many bad ones—could never have been closer than third as the race was run. That this incident should bring criticism upon other Navy racing pilots is another indication of the whiteness of what. A pilot cannot get out and push his plane

to victory, and in airplane races, as in horse and other races, other things being equal, the victory is inevitably to the swiftest As one racing pilot with considerable experience expressed it "There seem to be two schools of thought on racing just now. One, that any dumbell can be *trained* into a good racing pilot, the other, that it takes a superman with a chorus girl temperment. Personally, I think it takes a good, cool, experienced pilot who has flown all kinds of planes much, who is level headed, has confidence in himself, and thinks fast" The futility of training for racing should be apparent, as should the soundness of the opinion quoted above While the exigencies of the service may occasionally prevent the selection of one certain individual for a certain race, they will never prevent the selection of excellent pilots for every race The past record of Navy pilots speaks for itself, and is an indication that the system of selection used has, in general, been sound Perhaps enough attention has not been paid to the selection of *alternate* pilots, with the result that, in case of illness or death, an incompetent pilot may be called upon actually to fly in a race.

Preparedness Lacking

One of the greatest difficulties of racing is that, almost without exception, the planes for any particular contest are completed too late Despite forcing, pleas, threats, and night shifts such aircraft usually squeeze out a few hurried tests, and then are rushed into competition We never seem to learn that next year must be prepared for *now* In racing, boosted up engines, new radiators, fuel systems, etc, which have not been long in use are utilized in an effort to obtain the last possible inch of speed It is largely because of this that racing planes are frequently forced down A month for preliminary test work seems essential if all bugs are to be licked and the plane made thoroughly ready for the race On the other hand, useless and aimless preliminary flying may entirely eliminate the plane from the competition, and neither should it be completed so far in advance that it is a last year's model

It appears that a point is being reached in racing where, in the effort to make certain of victory, weight may be sacrificed until strength is reduced below a proper factor of safety, and landing speeds boosted to a dangerously high point The former consideration may or may not have had something to do with the crash of the Supermarine S-4 at Baltimore in 1925 and the unwillingness of the Italians to bank their planes or make sharp turns in 1926, and the latter consideration is from a design standpoint most enticing The Pulitzer landing speed limit of 75 m.p.h and a factor of safety limit for all parts could well be made conditions of the Schneider Trophy Contest As the rules for this competition were originally drawn, the navigability trials—sea-worthiness and water tightness tests—may be held in rough water If this were done, all entries would of necessity land slowly and be quite rugged in construction In fact, however, these trials are invariably held in smooth water, and are a relatively unimportant preliminary to the real contest in speed, and any other procedure would be of doubtful value from a standpoint of technical development or competition

Originally Included Cash Prizes

The Schneider Trophy originally included a cash prize of $5,000 Reestablishment of some such award might have a desirable effect in persuading members of the Aircraft Industry to meet sportsmen half way in building planes suitable for entry The present activities of such men as Commander Byrd and Lieut Al Williams show that private capital can be interested in aircraft achievements The question is—and it should be carefully considered—do we want to place our chances for the Schneider Trophy in private hands? England, the one nation which has given this method a thorough trial under ideal accompanying conditions (i.e., an industry ready and anxious to cooperate), has evidently voted it a failure If Government competition is not to be definitely counted upon each year, however, it would appear that we have no alternative, and must make definite plans in ample time for privately sponsored entries Some definite policy which can be relied upon in this matter must be adopted. It is understood that efforts are now being made to get some sort of entry ready for the 1927 race It may probably be too late to do so effectively. If 1927 is lost, let's get ready for 1928!

In this connection it may be well to point out that navies have ships, personnel, and other facilities beyond the resources of any individual or corporation; that the Navy brought the Schneider Trophy from England to the United States in 1923, and, despite many previous expeditions, private and official, this was the first entirely successful American attempt to enter aircraft competition abroad; and that in 1925 and 1926 the Navy was decidedly in the running for the Schneider Trophy despite appropriations and material which may have been far from ideal.

Pressure Distribution

Report No 257, covering "Pressure Distribution over a Wing and Tail Rib of a VF-7 and a TS Airplane in Flight," compiled by J W. Crowley, Jr, for the National Advisory Committee for Aeronautics, covers an investigation made at the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics, to determine the pressure distribution over a rib of the wing and over a rib of the horizontal tail surface of an airplane in flight and to obtain information as to the time correlation of the loads occurring on these ribs Two airplanes, VE-7 and TS, were selected in order to obtain the information for a thin and thick wing section In each case the pressure distribution was recorded for the full range of the angle attack in level flight and throughout violent maneuvers. Particular attention was given to the high and low angle of attack conditions The results show: (a) That the present rib load specifications in use by the Army Air Corps and the Bureau of Aeronautics, Navy Department are in fair agreement with the loads actually occurring in flight, but could be slightly improved; (b) that there appears to be no definite sequence in which wing and tail surface ribs reach their respective maximum loads in different maneuvers, (c) that in accelerated flight, at air speeds less than or equal to 60 per cent of the maximum speed, the accelerations measured agree very closely with the theoretically possible maximum accelerations. In maneuvers at higher speeds the observed accelerations were smaller than those theoretically possible

Report No 257 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D C

Air Forces on Biplane and Triplane Models

The air forces on a systematic series of biplane and triplane cellule models, forms the subject of report No. 256, compiled by Max M Munk, for the National Advisory Committee for Aeronautics The tests, conducted in the variable density tunnel of the Langley Memorial Aeronautical Laboratory, consisted of the determination of the lift, drag, and moment for each individual airfoil in each cellule, mostly with the same wing section.

The magnitude of the gap and of the stagger is systematically varied; not, however, the décalage, which is zero throughout the tests. Certain check tests with a second wing section make the tests more complete, and the conclusions more convincing

The results give evidence that the present Army and Navy specifications for the relative lifts of biplanes are good. They furnish material for improving such specifications for the relative lifts of triplanes A large number of factors can now be prescribed to take care of different cases

This report may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D C

The Joint Conference of the Aircraft Industry And the National Advisory Committee For Aeronautics

YET ANOTHER symptom of the cooperative spirit which exists between the American Aircraft Indnstry and the National Advisory Committee for Aeronautics was apparent at the Annual Joint Conference of the Committee on Aerodynamics, Committee of Materials for Aircraft, (both of the N A C A) with representatives of the American Aircraft Industry and the Aeronautical Educational Institutions, held at the Langley Memorial Aeronautical Laboratory, Langley Field, Va., on May 24, 1927, under the auspices of the National Advisory Committee for Aeronautics

The conference was called hy the chairman of the National Advisory Committee for Aeronautics with the following main objects in view, every one of which were most satisfactorily met

To secure a discussion of problems involved in the design and construction of aircraft, with special emphasis upon the problems growing out of the needs of commercial aviation, with a view to the incorporation of such problems into the research programs of the National Advisory Committee for Aeronautics for the ensuing year.

To acquaint the members of the conference with the facilities and methods employed at the Langley Memorial Aeronautical Laboratory in the conduct of scientific research on the more fundamental problems of flight;

To stimulate, by formal and informal discussions, the interest and the efforts of all concerned in correctly appraising the true state of aeronautical development, and in securing concerted effort to solve the problems deemed of greatest importance at this time;

To promote the interchange of technical information on aeronautical questions

The conference was opened in the Officers' Club at Langley Field at 8 30 a.m by Dr Joseph S Ames, chairman of the N.A.C A and chairman of the meeting, with an address in which he stressed the value of aeronautical research work and the importance of an organization such as the Advisory Committee keeping in the closest touch with the Aircraft Industry for the mutual benefit of both and the advancement of aeronautical engineering knowledge

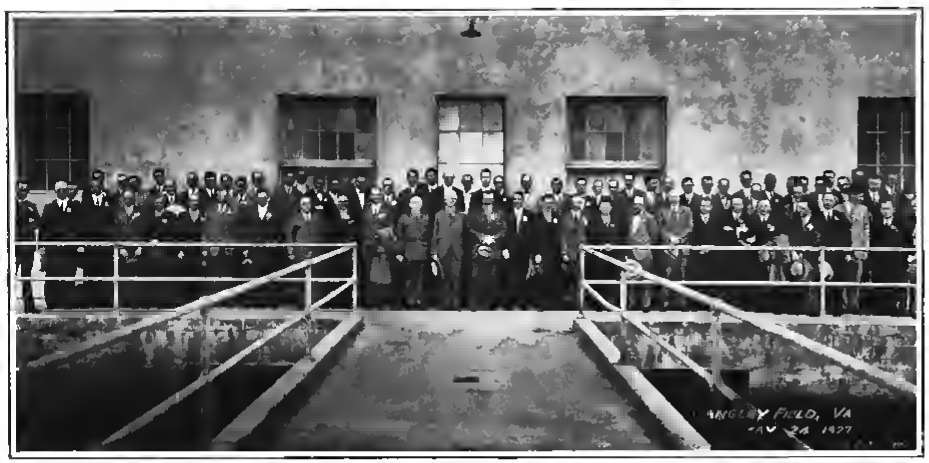
At the conclusion of the address hy Doctor Ames, the meeting was given over to a discussion by the individual members of the Langley Laboratory staff in charge of various sections of the work, of the various phases of the experimental and research work being undertaken. This placed the listeners, some seventy in number, in an admirable position for understanding the work which they were to witness later. The entire conference split up into groups and proceeded to make a tour of the Laboratory and inspect the work. It was at this time that all present obtained a vivid impression of the immense importance wrapped up in the activities of the N.A.C.A. in view, very largely, of the fact that so much of the experimental work undertaken is of such a nature that few if any aircraft manufacturing concerns would be in a position to carry it out

Work Divided Into Three Sections

The experimental work carried out at Langley Field by the N A C A. can, in general, be divided into three sections, namely, aerodynamic laboratory work, full scale work, and engine research. In all these fields, the Langley Laboratory has long been a leader in the world, but particularly in the matter of full scale research, has the N A C A. been responsible for outstanding progress

As the initial item of inspection, the party to which the writer was attached, visited the room in which were displayed some of the numerous forms of instruments developed by the research staff for full scale research work. G L Dawson, who was in charge of this display, pointed out the details of the instruments which ranged from recording pressure manometers and speed indicator to a very neat and ingenious form of delicate air speed indicator This latter operated on the principle of the electric current created by

(Continued on Page 1236)



Members of the joint N A C A. and Aircraft Industry Conference.

Commander de Pinedo Continues Flight

Santa Maria II Leaves New York and Visits American and Canadian Cities Before Taking off from Trepassy on Uncompleted Flight to the Azores

THE SANTA MARIA II, the Savoia seaplane in which Comdr. Francesco de Pinedo is continuing his Four Continent Flight, took off at 3:08 p.m., May 11, from the East River, New York City, where it had been lying since the day before. Commander de Pinedo was taken out to the seaplane in a police launch at 1:30 p.m. His plane was towed two miles away to a point off Fort Schuylar. After taxiing for awhile, it rose and climbed a sufficient height to permit it to pass over the bridges across the river.

During part of the flight between New York and Philadelphia, Commander de Pinedo was forced to pass through a thunder and lightning storm. When he reached Philadelphia, the city was experiencing a heavy downpour of rain, which, however, did not deter several thousand people from assembling on the shore of the Delaware River and giving the Italian flier a rousing welcome. He arrived in Philadelphia at 4:32 p.m. The plane made a low sweep over the Navy Yard and then descended to the river opposite the aviation field. A launch on board which were Rear Admiral Thomas P. Magruder, and a reception committee composed of prominent Philadelphia citizens, put out to meet Commander de Pinedo.

At 7:25 a.m. May 12, Commander de Pinedo left Philadelphia and arrived in Charleston, S. C. at 1 p.m. The seaplane made the 640 mi. trip without incident in six and a half hours. Together with Captain del Prete and Viklo Seachetti, who are making the flight with him, Commander de Pinedo was greeted by city officials and local members of the Sons of Italy Society. Mayor Thomas P. Stony gave a luncheon in their honor and a banquet was tended them during the evening by the Sons of Italy.

On May 14, Commander de Pinedo flew up the flooded valley of th Mississippi River against adverse winds and landed down the river, opposite Memphis to refuel. He spent the night at this place. He reached Chicago around 3 p.m. May 15. En route, he circled over St. Louis three times before flying toward Chicago.

Chicago acclaimed the Italian flier, the enthusiasm of its citizens being so great that he agreed to delay his departure for Montreal for several hours. The city honored him in a banquet during the night of his stay. Commander de Pinedo was prevented, however, from leaving Chicago until May 17, because of high northwest winds. Three times, he attempted to leave the water, but his efforts were unsuccessful. Commander de Pinedo spent the afternoon touring the city. At Jackson Park he stopped to inspect the duplicate of Columbus' flagship, the Santa Maria, for which ship his Savoia seaplane is named.

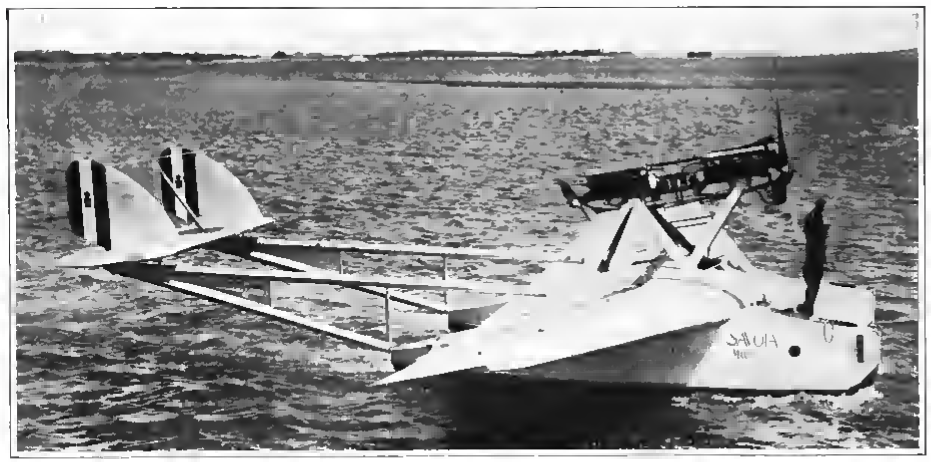
From Chicago to Montreal and from Montreal to Shippegan, N.B., by way of Rimouski, were the next stages of the flight. Commander de Pinedo reached Montreal at 6:35 p.m., having flown the 800 miles in approximately 11½ hr. His plane, the Santa Maria II, had been expected earlier, and throughout the afternoon great throngs crowded the harbor front. He was welcomed officially by Senator W. L. MacDougald, chairman of the Harbor Commission, and the Italian Consul-General, Signor P. Margotti. Commander de Pinedo arrived at Shippegan at 5:55 p.m., May 19.

Leaving Shippegan Island at 11:25 a.m., May 20, Commander de Pinedo encountered fog over the Gulf of St. Lawrence, but the weather proved fairly good along the south coast of Newfoundland to St. Mary's Bay. From this point to Trepassy, where he arrived at 6 p.m., he again encountered fog. On Monday, May 23, the Italian flier hopped off from Trepassy at 4:30 a.m., to fly to the Azores.

The Santa Maria II met strong winds on leaving Trepassy and the strength of the Savoia plane was taxed severely by this continuous onslaught. When two-thirds of the trip to the Azores had been completed, Commander de Pinedo decided that, owing to the high consumption of gasoline, he would not be able to make the full flight. He alighted on the ocean near a Portugese sailing vessel, which towed his plane.

When the Santa Maria II was taken in tow, Commander de Pinedo expected that weather conditions would improve shortly and permit him to continue his flight. However, the weather became worse, and on May 25, one of the ailerons of the plane became damaged, definitely ending all idea of a resumption of the flight. On May 26 the Italian steamer Superga arrived and took the plane in tow.

Rome plans a memorable reception to its great long-distance flier, the feeling of Italians being that, despite the fact that he has met with two reverses, the destruction of the first plane, and the forced landing of the second, his flight from a technical standpoint is a complete success.



Commander de Pinedo's Savoia seaplane at Squantum, Mass. P & A Photo

The Time Lag of Aircraft Thermometers

Efforts have been made by the Bureau of Standards, Department of Commerce to determine the time lag of thermometers used to measure air temperatures from aircraft. It is a well-known fact that if a thermometer is taken outdoors from a heated room on a cold day an appreciable time will elapse before the correct outside temperature is indicated. In other words the thermometer has time lag. For various reasons it is important to determine the temperature of the air through which a plane is flying and it is equally important that the time lag in the instruments used should be as small as possible so that accurate information can be had.

The time lag is defined for any one thermometer under given conditions of immersion and ventilation as the number of seconds necessary for it to indicate two-thirds of the difference between the original temperature and that of a constant temperature bath into which it has been plunged. A bath may be of air, water, oil, etc. The value of this quantity for a given condition varies greatly for the different types of thermometers.

Air temperatures decrease with altitude and as aircraft climb very rapidly the recording instruments do not exactly depict the true changes in the temperature at the different altitudes as soon as the changes occur. Data on the time lag of various types of thermometers is therefore of value in both the design and the selection of these instruments. Measurements were made by the Bureau of Standards of the time lag of a representative group of instruments selected from those available in the Bureau's laboratory.

It is known that the lag is dependent on the velocity of the air stream to which the temperature element is exposed. The values reported here were for an exposure of the temperature elements in an improvised wind tunnel in which a velocity of 17 m.p.h. was maintained. The time lag was found to vary from 13 to 57 sec. for six instruments. A chemical thermometer of the mercury-in-glass type, very similar to a good mercury-in-glass house thermometer, had a lag of 18 sec. This, it should be remembered, is for the case when the bulb of the instrument is ventilated by an air stream of 17 m.p.h. For exposures in air at the usual flying speeds the values are roughly one-half of those found for 17 m.p.h.

Canadian-American Air Relations

By an exchange of notes between the Department of State and the Canadian Legation, the agreement between the United States and Canada with regard to the entry of United States pilots and aircraft into Canadian territory, has been extended to and including Oct. 31, 1927, and has been made reciprocal.

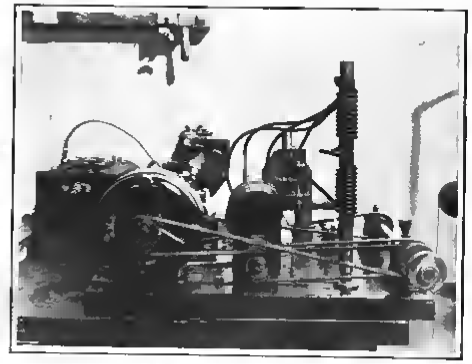
This arrangement has been in effect since 1922 and provides in general that when an American machine or pilot wishes to cross the International Boundary and fly in Canada, notification should be sent in advance to the Secretary of the Air Board, Ottawa, giving the date of the proposed flight; the owner's name and address; the pilot's name and qualifications; the type of machine to be used; the route and duration of the proposed flight; and the purpose for which it is being undertaken. All such aircraft must be licensed

Acme Airtite Ignition Cable

Acme Airtite high tension ignition cable, manufactured by the Acme Wire Co., New Haven, Conn., was designed to produce a cable that was oil and ozone proof. Actual tests conducted on this cable have shown an unequalled performance when subjected to severe Corona tests. Its economy lies in its remarkable endurance, and in the fact that the enamel coating makes it proof against the effects of moisture, salt and fresh water, ozone, gasoline and oil. The special enamel coating on this Airtite cable prevents the rubber insulation from deteriorating. Severe Corona tests have been conducted on this cable in both air and salt saturated air at room temperatures. No failure occurred in one hundred hours.

This cable has also been subjected to the dielectric test, the oil test and the aging test with satisfactory results.

The rubber insulation on the Acme Airtite High Tension Ignition Cable contains 30% Para rubber, and is so designed as to make this cable 7 millimeters outside diameter. The conductor in the standard 14 cable, known as Acme Airtite Ignition Cable No. 714, consists of 19 strands of No. 27 tinned copper wire. This cable conforms to the S.A.E. specifications.



A Corona test on Airtite cable, the upper part of the steel rod showing what this test has done to ordinary steel cable and the lower part of the rod showing that Airtite cable has not been affected by the test.

The Acme Airtite cable, made to conform to the U. S. Army Specification No. 94-28003 H, consists of 16 strands of No. 28 tinned copper wire, which is equivalent to No. 16 B&S guage. A close wrap of cotton is wound directly over the conductor, over which the rubber insulation is applied.

Confer on Laredo Air Mail

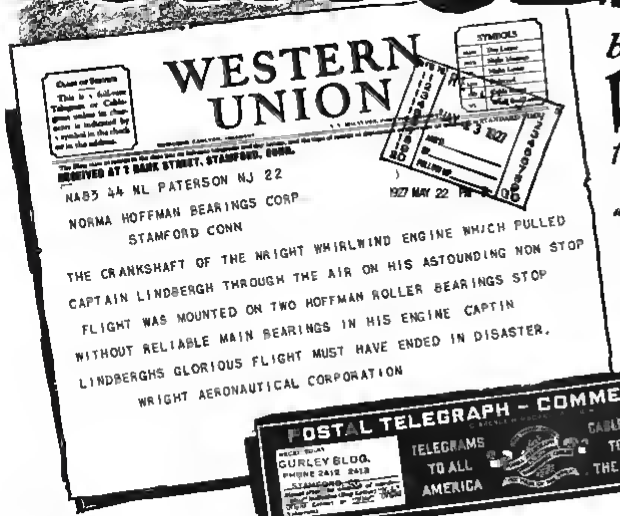
W. Irving Glover, Second Assistant Postmaster General, conferred recently at Wichita Falls, Tex., with committees from chambers of commerce of San Antonio, Austin, and Waco, Tex., on the advisability of installing a new contract air mail route through those cities from Laredo, Texas, connecting with the National Air Transport line at Dallas, for Chicago.

Laredo is on the Mexican border and is an international exchange office for mails between the United States and Mexico. Another possible route considered was the proposal for extending air mail lines to the southern border of the United States ready for a future hook-up with lines for South American points by way of El Paso. The Laredo route, however, is favored from the standpoint of quantities of mail available en route.

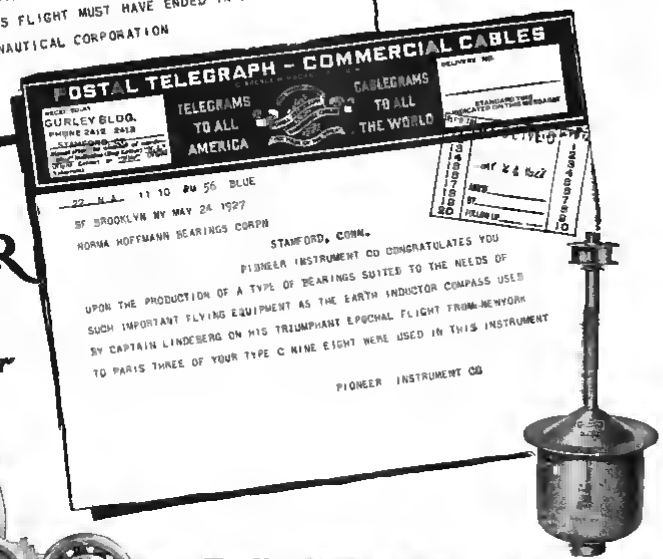
During his trip to Texas, Mr. Glover also discussed with Texas interests the possibility of a second leg from the Chicago-Dallas route to Galveston by way of Houston.

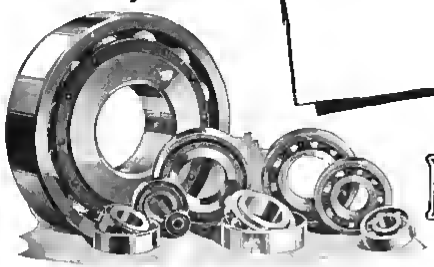
CHOSEN

by WRIGHT for the severest duty in the "Whirlwind" Engine—the main crank shaft bearings

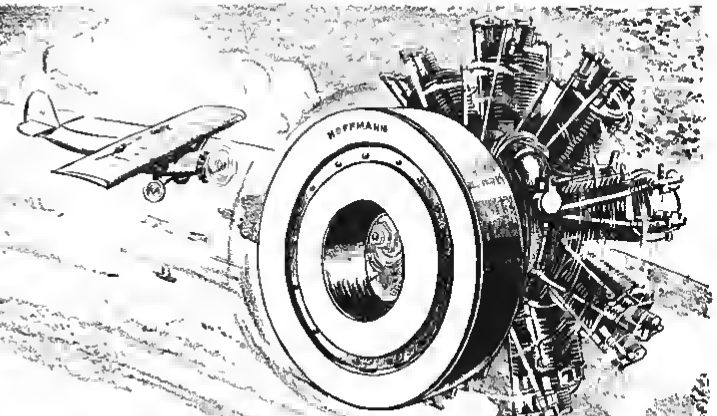


and by PIONEER for the Sensitive Earth Inductor Compass





NORMA BALL &



PROVEN in Service

On the San Diego-New York-Paris Flight by Capt. Charles Lindbergh

AGAIN the endurance and dependablility of Norma-Hoffmann Precision Bearings have been demonstrated in this epoch-making trans-Atlantic flight - as they were in the record-breaking 51-hour non-stop flight of the Bellanca plane.

NORMA-HOFFMANN BEARINGS CORP'N.
STAMFORD, CONN., U. S. A.

-HOFFMANN ROLLER BEARINGS

Joint Conference of the Aircraft Industry and the N. A. C. A.

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a revolving armature (in this case two tiny multi-bladed fans) within an electro magnetic field. According to the speed of rotation of the fans due to the air current, so a change in the current generated was registered and, while both the initial current and the change were very small, the delicacy of the instrument in measuring small changes in wind velocity was such as to enable fine measurements to be made.

Engineers Experimenting

Passing from the full scale measuring instruments to the experimental work which is being carried out on heavy oil engines for aircraft, visitors found the N.A.C.A. engineers engaged on a class of experimental work which, while having a most significant value from the standpoint of aeronautical development—owing to the fire hazard elimination—was at the same time work which, owing to its very nature is such that few but an organization such as the N.A.C.A. could carry out. W. F. Jonchim, who is in charge of heavy oil engine development for aircraft, introduced visitors to the special variable compression and variable valve experimental work in which these variables are brought into play. At this time, those present had an opportunity of witnessing the operation of experimentally photographing the oil spray injection which is necessary for the atomization of the fuel for a Diesel type of engine. A photograph published herewith gives a vivid impression of exactly what happens in the injected spray. The oil is injected at 8000 lb. per sq. in. into a compressed air chamber at a pressure of 200 lb. per sq. in. The interval between each exposure was made by means of a series of electric sparks produced by means of a charged condenser. The exposure was of the order of one-millionth of a second and the time between each exposure, one five-thousandth of a second. Thus, it will be seen that the drum on which the photographic film was wrapped was moving very fast but the speed of the exposure was sufficiently short to prevent blurring of the picture.

Aerodynamic Work Impresses

Another interesting feature of the inspection was the working set-up of the Roots type supercharger discussed by Marsden Ware, of the N.A.C.A. staff who has carried out a great deal of experimental work in this field.

Passing on to aerodynamic work, visitors were much impressed with their inspection of the variable density wind tunnel of which much is already known, and with the work being carried out in the small tunnel by E. G. Reed. Mr. Reed was doing some experimental work on the effect of slots in the upper surfaces of airfoils through which pressures or suctions are created. Simultaneous pressure readings visualized over the entire upper and lower sections at any one element, revealed some most interesting phenomenon.

Mr. Carroll, assisted by W. L. Crowley, introduced the visitors to the full scale experimental work being carried out at Langley Field by the N.A.C.A. and later gave some demonstrations in flight of certain aircraft including the machine equipped with upper wing slots through which air was forced in flight. The added control of the machine at high angles was noticeable.

Finally, as a climax to the demonstration, the visitors were made witnesses of the initial running of the giant wind tunnel recently completed for the test of aircraft propellers in the full scale condition. The tunnel, which is an open working section closed circuit type, had a complete Sperry Messanger plane rigged up in it and the twin 2000 hp. Diesel engines which drive the monster fan were started for the first time. The visitors made a complete tour of the tunnel guided by E. W. Miller.

After lunch, the conference went into session again and the chairman, Doctor Ames, called upon those present to discuss certain details of the N.A.C.A. work in its relation to the Industry's requirements and to make suggestions as to items which might be included in the future program. Among those who spoke were: Frank H. Russell, representing the Aeronautical Chamber of Commerce; Hon. Edward P. Warner, Admiral H. I. Cone, representing the Guggenheim Fund; T. P. Wright, representing the Curtiss Company; Chas. L. Lawrance, representing the Wright Aeronautical Corp.; Chas. Ward Hall; Sherman Fairchild, representing the Fairchild Aviation Corp; Dr. Karl Arnstein, Goodyear Zeppelin Company; Captain Robert W. A. Brewer, Pitcairn Aviation Inc.; Ralph Upson, Aircraft Development Corp.; Dr. Lyman H. Briggs, of the Bureau of Standards, and Maurice Titherington, Pioneer Instrument Co.

N. A. C. A. Established in 1915

The result of the conference was undoubtedly to strengthen the already existing opinion on the tremendous importance of the work of the National Advisory Committee for Aeronautics in the development of aircraft engineering in all its phases.

The National Advisory Committee for Aeronautics was established in 1915. Up to that time the designing of airplanes and their testing was merely in the experimental stage and depended much upon the individual whims of builders and pilots. Due to skill on the part of some designers, and a successful sequence of circumstances, many planes were able to meet requirements for flight. But many were not able to stand the test, and were abandoned without the designer ever knowing the reason for failure. The same conditions applied in the field of testing. Wind tunnel tests could be made, but a manner for determining the effect on full size aircraft was lacking. Flight tests consisted merely of the observations of pilots, formulated on their opinions, and without substantiative data.

It was to remedy these conditions by supervising and directing the scientific study of the problems of flight that the committee came into existence. It consists of twelve members appointed by the President. The law provides that its personnel shall consist of two members from the War Department, from the Office in Charge of Military Aviation, two members from the Navy Department, from the Office in Charge of Naval Aeronautics, three members representing respectively the Smithsonian Institution, the U. S. Weather Bureau and the U. S. Bureau of Standards, and five additional

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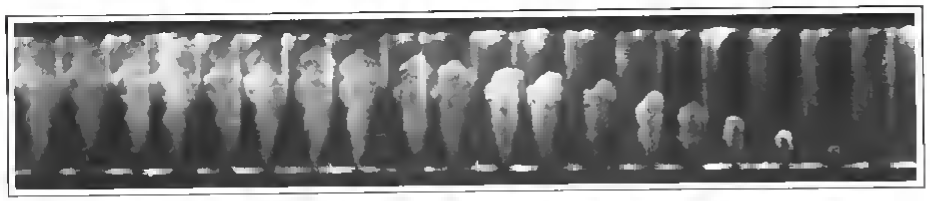

A photographic record of the injected spray of Diesel oil under experimental conditions. The oil had a specific gravity of .858 and was injected at 8000 lb./sq. in. into compressed air at 200 lb./sq. in. The time interval between each exposure was five thousandths of a second and the exposure (spark) one millionth of a second.

Joint Conference of the Aircraft Industry and the N. A. C. A.

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members, appointed by the President, all serving without compensation.

The first steps taken were the creation of a research organization, the invention and development of research methods and instruments and the making of tests in the laboratory, on the ground and in flight. In a research organization, new problems are constantly arising. No matter how old the field of endeavor may be, new students are always confronting the investigator, and fresh problems must be met. In a field as young as was aviation at the time of the formation of the committee, the questions that arose immediately were naturally legion. In this committee, problems may be presented through various channels. A problem may be offered either by the committee, as a body, or one of its members, it may be proposed by an outside individual or organization or by a department of the Government.

The main committee consists of three sub-committees, and to the latter are referred the problems which are presented. The sub committees attack the problems on very broad lines and with a view usually of determining the organization which should handle them. Recommendations are then submitted to the main committee. The question may be handled at Langley Field, the Bureau of Standards or may be referred to organizations such as the Massachusetts Institute of Technology, New York University, the University of Illinois, the Leland Stanford Jr. University, or similar centers of research.

Conferences Informal

When some particular question is referred to the Langley Field research laboratory, a conference of the engineers in charge is held with the heads of the divisions to which the subject relates. The general scope of this topic of research is discussed, a comparison made with research facilities at hand and new instruments that may be necessary considered. These conferences are entirely informal. At their conclusion, a time schedule is made and the estimated cost of the investigation given. Short conferences are held every week, at which are present the heads of the technical divisions and sections. A general report of work on hand is given at these meetings, enabling each division to keep in touch with activities.

The following is a list of persons attending the conference, other than those stationed at Langley Field:

Dr. Joseph S. Ames	Chairman, N.A.C.A.
Dr. Karl Arnstein	Goodyear Tire and Rubber Company
Lieut. R. S. Bernaby, U.S.N.	Bureau of Aeronautics, Navy Dept.
Henry Berliner	Henry Berliner Company
M. B. Bleecker	Curtiss Aeroplane & Motor Company.
B. C. Boulton	Loening Aeronautical Engineering Corp.
J. S. Bray	Allison Engineering Company
Dr. L. J. Briggs	Bureau of Standards
Dr. P. L. Browne	Forest Products Laboratory
Dr. George K. Burgess	Member N.A.C.A.; Chairman of Committee on Materials for Aircraft. Director Bureau of Standards.
E. S. Campbell	Boeing Airplane Co.
Wm. G. Chamberlin	Pratt & Whitney Aircraft Co.
S. K. Colby	American Magnesium Corp.
Admiral H. I. Cone	Daniel Guggenheim Fund for the Promotion of Aeronautics
R. V. Davies	Aluminum Company of America.
Lieut. W. S. Diehl, U.S.N.	Bureau of Aeronautics, Navy Department.
E. H. Dix, Jr.	Aluminum Company of America
Dr. H. L. Dryden	Bureau of Standards.
S. M. Fairchild	Fairchild Airplane Mfg. Corp.
Earl N. Findley	"U. S. air service."
Comdr. F. L. Gayhart	U. S. Navy Yard.
Dr. H. W. Gillett	Bureau of Standards
Charles Ward Hall	Charles Ward Hall, Inc.
Lieut. Lloyd Harrison, U.S.N.	Bureau of Aeronautics, Navy Dept.
Spencer Heath	Paragon Engineers, Inc.
T. H. Huff	
Dr. Zay Jeffries	Aluminum Company of America
F. B. Johnson	Material Division, Air Corps, McCook Field.
T. N. Joyce	Curtiss Aeroplane and Motor Co.
Prof. Alexander Klemin	Daniel Guggenheim School of Aeronautics, New York University
Dr. W. Klemperer	Goodyear Tire and Rubber Company
Capt. E. S. Land, U.S.N.	Member N.A.C.A.; Assistant Chief Bureau of Aeronautics, Navy Dept.
R. W. A. Brewer	Pitcairn Aviation, Inc.
Charles W. Lawrance	Wright Aeronautical Corporation.
W. L. LaPage	"AVIATION"
Dr. G. W. Lewis	Director of Aeronautical Research, N.A.C.A.
Major Leslie MacDill, U.S.A.	Material Division, Air Corps, McCook Field.
C. J. McCarthy	Chance Vought Corp., Long Island City
Prof. Charles F. Marvin	Member N.A.C.A., Chief, U. S. Weather Bureau.
L. C. Milhara	Glenn L. Martin Co., Cleveland.
W. H. Miller	Curtiss Aeroplane and Motor Co.
J. D. Mooney	Auto Engine Works.
F. H. Norton	
Comdr. E. M. Pace, Jr., U.S.N.	Bureau of Aeronautics, Navy Dept.
G. T. Perrier	Keystone Aircraft Corporation.
H. S. Rawdon	
Capt. H. C. Richardson, U.S.N.	Bureau of Aeronautics, Navy Dept.
Lieut. Comdr. D. Royce, U.S.N.	Bureau of Aeronautics, Navy Dept.
F. H. Russell	Aeronautical Chamber of Commerce.
K. W. Schroeder	
Lieut. Jos. M. Shoemaker, U.S.N.	Navy Yard, Washington, D. C.
R. H. Smith	University of Michigan.
Edward A. Stalker	Pioneer Instrument Company.
M. M. Titterington	Forest Products Laboratory.
G. W. Trayer	National Advisory Committee for Aeronautics.
Starr Truscott	Bureau of Standards.
Dr. L. B. Tuckerman	Aircraft Development Corp.
Ralph H. Upson	Glenn L. Martin Company
C. A. Van Dusen	Assistant Secretary, N.A.C.A.
J. F. Victory	Thomas-Morse Aircraft Corp.
Raymond Ware	Assistant Secretary of the Navy for Aeronautics.
Hon. Edward P. Warner	Chance Vought Corporation.
Michael Watter	
John Weatworth	Bureau of Standards.
Prof. H. L. Whittemore	Curtiss Aeroplane and Motor Co.
T. P. Wright	Construction Dept., Navy Yard.
Dr. A. F. Zahm	

Raymond D. Harris Joins Embry-Riddle

Raymond D. Harris, lately of Seattle, Wash, is to take charge of the ground courses for the Embry-Riddle Flying School at the Lunken Airport, Cincinnati, O.

Lieut. Harris at one time was an observer for the Forest Patrol of California. Later he was appointed as a flying cadet and transferred to the flying school, from which he graduated at the head of the class, with the rating of Pursuit Pilot. Since receiving his commission in 1922, Lieut. Harris has followed commercial aviation, studying aeronautical engineering at the University of Washington. Lieut. Harris has piled up almost one thousand hours flying time.

Additions To the Caterpillar Club

On April 27 Lieut. Stewart W. Towle, Jr., Air Corps, became eligible for membership in the Caterpillar Club which is composed of persons who have saved their lives by parachute jumps from disabled airplanes.

Lieut. Towle was cruising alone in a Vought plane about 1,800 feet above the northern limits of Champaign, Ill., when it caught fire, presumably from a bursted gasoline line. Lieut. Towle jumped over the side of the plane and pulled the rip cord of his chute, which promptly opened. He beat out with his hands the fire which he found about his clothing. He landed safely, and is now recovering from the experience.

Lieutenant Towle was graduated from West Point in the summer of 1923, and from the Air Corps Advanced Flying School, Kelly Field, Tex. in September, 1924. He reported at Chanute Field in October of that year and entered the Department of Photography of the Technical School, in which department he is now assistant instructor.

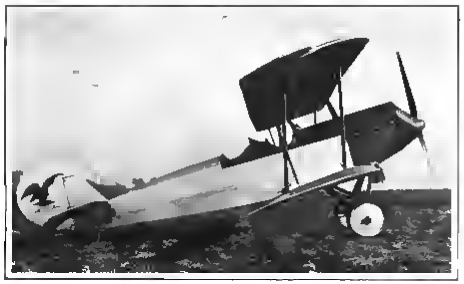
Lieut. Stephen A. McClellan, a Marine Corps reserve pilot, residing in Washington, D. C., made a parachute jump from approximately 6,000 ft. altitude, on the morning of April 15, when the airplane he was flight testing before officials of the Navy Department at the Naval Air Station, Anacostia, D. C., disintegrated during a dive. Lieut. McClellan had the presence of mind to leap from his disabled plane and pull the rip cord of his chute. He landed unhurt in the Potomac River near Hains Point. He unfastened his chute before striking the water, and when a launch from the Naval Air Station reached him he was swimming for shore.

At present there are forty-one members of the Caterpillar Club, with a total of forty-seven life-saving jumps.

The American Eagle Commercial Plane

Outstanding Design that Involves Several Individual and Distinct Features Which Reduce Maintenance

THE AMERICAN EAGLE light three-place tubular steel commercial airplane, manufactured by the American Eagle Aircraft Company, of Kansas City, Mo., is an outstanding design involving several individual and distinct



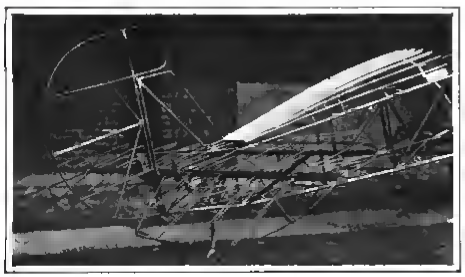
Side view of the American Eagle

features which greatly reduce maintenance. The direct steel tubing aileron control is positive, control wires, pulleys and the accompanying friction being wholly eliminated. The tail skid can be removed to re-wrap shock cord by removing two bolts which are easily accessible. The elevator wires are inside the fuselage, making it convenient to lift the fuselage at the rear, without climbing over the wires. This also lowers parasite resistence considerably.

The split type undercarriage has distinct advantages when taking off in high grass, rough ground or soft fields. The wide tread of the undercarriage is an asset when taking off in a cross wind or in the event of a low-wing landing.

The fuselage frame is of seamless steel tube. The joints are steel welded and the entire fuselage forms a bridge-like frame that defeats twisting and buckling even under unusual circumstances. The engine mount is constructed of heavy gauge, high strength tubing, giving the maximum strength necessary to this part of the structure.

The tail group assembly is also constructed entirely of welded steel tubing. The control surfaces are designed to allow



Tail group of the American Eagle.

ample controllability at stalling speed as well as at maximum speed. The balanced rudder is very sensitive at as low as 25 m.p.h. and makes it possible to bring the plane out of a spin very quickly.

The large surface of the single balanced ailerons makes them very efficient and eliminates cumbersome mechanism. The wings are of improved construction, combining extreme lightness with maximum strength. The exceptionally heavy wing fittings give the American Eagle great strength qualities. The pilot's cockpit is constructed and arranged for the pilot's safety, convenience and comfort. It has a military type seat. The instrument equipment is complete and is arranged on an aluminum dash. Throttle, ignition switch, choke, and radiator shutter control are so located as to be at the pilot's convenience at all times. Both cockpits are upholstered throughout with Spanish leather. The front cockpit is roomy, providing accommodation for two passengers, when the dual control is removed. The floor provides room for four average size suitcases or bags and sufficient leg room for the passengers.

The plane may be powered with either a 150 hp. Hispano-Suiza or a 200 h.p. Wright Whirlwind engine. The completely cowled engine prevents the valve action from being exposed to dust and rain as well as allowing the oil to remain on the rocker arms, rather than on the windshields, fuselage and wings. The cowling assembly is constructed of heavy gauge aluminum and is not pressed nor hammered, thereby enabling it to hold its shape indefinitely. The hood is of the automobile type and is quickly removable. The radiator is underslung, in order to give the pilot full vision. It is a large Cartridge core radiator, equipped with streamline shutters, controlled from the pilot's cockpit, and so designed that, should the control become disconnected, the slipstream forces them open.

All fabric covered sections of the American Eagle are coated with the fresh nitrate dope, two coats of plain and four of

Fuselage showing seamless steel tubing.

aluminum pigmented dope are applied. All woodwork is given two coats of spar varnish as a protection from moisture and heat. The steel tubing is varnished inside.

Specifications of the American Eagle and performance details supplied by the manufacturer are as follows:

Length overall	24 ft.
Height	8 ft., 4 in.
Wing Spread	30 ft.
Chord	5 ft. 2½ in.
Weight	1,100 lb.
Wing curve	Aeronautics 2-A modified
Landing speed	30 m.p.h.
Cruising speed	85 m.p.h.
Maximum speed	93.5 m.p.h.
Climb	500 ft. first min. with 400 lb load
Ceiling with pilot	16,000 ft.
Ceiling loaded	12,000 ft.

London-Canada Flight Planned

Capt. E. P. Courney, British aviator, within the next few weeks will attempt to fly a seaplane from London to Canada.

The plane will carry two pilots, a navigator and one passenger who will pay his fare for the trans-Atlantic flight.

The plane will stop at the Azores on the trip to Canada, it is said, but on the return flight will attempt a non-stop trip.

U. S. Airway Map Completed

What is said to be the first detailed airway map of the United States, representing a total mileage of about 38,000 mi., all of which is to be marked eventually under what is known as the St. Joseph system, has been completed by Carl H Wolfley of St. Joseph, vice president of the National Aeronautical Association, who has been engaged for nearly two years in working out the details.

A system of marking the airways for the guidance of airmen is included in the plans. The marking system was first suggested by Harry Block of St. Joseph, governor for Missouri of the National Aeronautical Association, following an air trip to Dayton, Ohio, three years ago, in which the lack of marking was noticeable, and it was worked out as to detail by Mr. Block, Mr. Wolfley and Charles H. Wagner, at that time president of the St. Joseph Aeronautic Association and manager of the St. Joseph office of the Standard Oil Company of Indiana. Since then Mr. Wolfley has been working on the details and the completed map is now published for the first time.

On a recent trip to Washington the plans were presented to the War Department, the Post Office Department and the Department of Commerce by Mr. Wolfley, and they were approved by these departments.

Nine trunk lines are provided in the map. These center in St Joseph, which is nearer the geographical center of the United States than any other large city. Rosecrans Municipal Air Field is situated here. The investment of the city in the field, all-steel hangar and other equipment is $125,000.00. The city is preparing to light the field for night flying.

The marking of the airways presented a big problem. A plan was worked out under which the tops of buildings are marked with the name of the town or city, in letters visible from at least 2,000 ft. in the air and with an arrow on the building pointing to the nearest landing place. Most of the letters are six to eight feet high and are so placed as to be easily visible from the air. The pilot is provided with a map similar to the highway maps used by motorcar tourists and he can check the towns by the key on the map.

The actual marking of the airways was started over one year ago by the Standard Oil Company of Indiana in the ten states under the jurisdiction of that company. Most of the markings are being placed on buildings in different towns owned by the company. The markings by the Indiana company are in the ten states of Missouri, Iowa, Illinois, Michigan, Minnesota, Indiana, North Dakota, South Dakota, Wisconsin and Kansas. The company is bearing all the expense of the marking.

After the Standard Oil Company of Indiana agreed to the markings, Mr. Wolfley began a correspondence with other oil companies to extend the system over the country. Months were spent in explaining the plan and in selling it to the various companies.

Mr. Wolfley announces now that the entire country is covered with the exception of the state of Pennsylvania, and he hopes soon to have that state in line.

This is the first map of the kind ever developed in the United States. The Standard Oil of Indiana, which led the movement, has about 1,500 cities and towns on its routes. An aeronautic survey of the district is kept in the manager's office. A questionnaire is mailed to each representative of the company setting forth the air landing conditions in each station. The information includes the following: the size of the landing field; the distance of runways, whether or not it is a four-way field; the distance from downtown district or post office; whether the field is privately or municipally owned; the local organization in charge of aviation matters.

The surveys are regarded as valuable. When all the information is compiled, the National Aeronautic Association, to which the information will be available, will have a good idea of the status of aviation developed throughout the country and will be in better position to further organize the movement.

Mr. Wolfley suggests that in places where no building is available, the name of the town can be placed on the ground in concrete letters, painted white, or they could be made of crushed rock. The tops of the letters should point north. If there is no nearby landing field, the arrow should not be used, because this would confuse the pilot.

The suggestion for the marker in the landing field is a circle of concrete, 100 ft. in diameter and 4 ft. wide, with a cross in the center and arms 25 ft. long. The marker is to be made flush with the ground. The cross is used for four-way landing fields only. If accessible from two directions, a straight line is used, if from the north and west, an angle and other directions the same.

In addition to the markings for the guidance of the pilot during the day, the Federal Government is marking some of the routes for night flying. These are the routes used by the air mail. It is hoped eventually to have all of the trunk lines lighted for night flying as the time is rapidly approaching, say aviation enthusiasts, when night flying will be firmly established in the air program of the country, making a continuous service day and night.

Sale of New Liberty Engines

The Air Corps has released for sale, for use exclusively for flying purposes within the territorial limits of the United States, a limited number of new Liberty "12", 400 hp. airplane engines, which are stored at the Little Rock Air Intermediate Depot, Little Rock, Ark.

New and unused Liberty engines will be sold "as is," at $1,000 each, plus a handling charge of $10.00, f.o.b. Little Rock Depot, to any purchaser who presents conclusive evidence that he has a plane, either built or building, in which to install it, and that the plane will be used in this country. Engines will be sold at the above price for domestic use only, and the Government reserves the right, at its discretion, to require bond or such other assurance as may be deemed necessary that the engines sold under this condition will not be exported.

These engines are so well and favorably known in aviation circles as to require no introduction or descriptive remarks. They are new in the sense that they have not been used. They were manufactured during the years 1917 and 1918, and, while every ordinary precaution has been taken to preserve them during the period they have been in storage, no guaranty is given by the Government that they are in perfect condition. They are complete with the usual kit of tools, but no spare parts or accessories are included.

The terms of the sale are that twenty percent of the amount of the purchase price, in the form of cash or certified check payable to the Finance Officer, U.S. Army, must accompany all orders; the balance of the purchase price must be remitted and shipping instructions furnished on the engines awarded within thirty days from date of award. For further information, address, Chief, Field Service Section, Air Corps, Fairfield, Ohio.

Greensboro, N. C., Officially Opens Airport

The official opening of the airport at Greensboro, N. C., which will serve Greensboro, Winston-Salem and High Point, the triangle industrial cities of the state was held on Saturday, May 28. Some thirty or more planes took part in the varied contests and events included in the ceremonies. Pitcairn Aviation, Inc., of Philadelphia, hold a contract for the air mail service between New York and Atlanta and also the contract for the commercial operation of the local field. Air mail service will not begin for several months but commercial flying began the opening day. The field is the first on the line below Washington to be placed in operation.

Fuel and Oil Consumption Important Factor On Long Distance Flights

(Continued from Page 1215)

heavy initial loading of the plane, the bad weather for some one thousand miles, the necessity for climbing over a sleet storm, the average speed of at least 108 m.p.h., and the actual distance which must have been considerably greater than 3,600 miles, this fuel consumption is simply astounding.

The oil consumption is given in the Paris dispatches as 11.8 gal. for the trans-Atlantic trip. This gives a consumption per hour of .354 gal. or 2.83. Figuring the horsepower at 1600 r.p.m. as 129 hp., the specific consumption would be .0219 lb./hp./hr.

The mileage covered on fuel and oil constitutes another interesting sidelight. On the trans-continental trip, with the average r.p.m. approaching 1700, the average mileage was 8.6 miles per gallon of fuel, and 807 miles per gallon of oil. On the New York-Paris trip, with the r.p.m. about 1600, Lindbergh covered 9.7 miles per gallon of fuel and 305 miles per gallon of oil, on the basis of 3,600 miles traveled, which we know is a good deal too low.

The figures obtained from Lindbergh's brilliant flight compared with those obtained from the world's record duration flight of Chamberlin and Acosta in the Wright-Bellanca plane with exactly the same type of engine exhibit an interesting contrast between flying for distance and flying for duration. Taking 4,100 miles as a conservative estimate of the distance flown by Chamberlin and Acosta on 385 gal. of gasoline and 4.93 gal. of oil, we get an average of 8.7 miles per gallon of gasoline and 520 miles per gallon of oil as against Lindbergh's 9.7 miles per gallon of gasoline and 305 miles per gallon of oil. On account of the constant decrease in r.p.m. on the endurance flight, it is of course impossible to estimate the specific gasoline and oil consumption.

Airplanes Aid Forest Fire Control

In the coming Summer campaign against fire, several Army airplanes will be put into service to help the forest officers protect the National Forests of California and the Pacific Northwest. Until recently it was thought the War Department would be unable to supply planes during the coming Summer, and that as a consequence the air patrol in the West would have to be dispensed with, or at least seriously curtailed, but word has just been received that planes will be available, and plans are now under way for this season's air patrol work.

From bases at Mather Field, near Sacramento, Cal., at Glendale, near Los Angeles, at Eugene, Ore., and at Seattle and Spokane, Wash., the planes, piloted by Army Air Corps reserve officers, temporarily in the employ of the Forest Service, and accompanied by forest officers acting as observers, will make special flights this Summer whenever an emergency arises. In cloudy or hazy weather and in regions where the atmosphere is heavy with the smoke of forest fires so that the visibility at ground lookouts is greatly reduced, planes take up the work of patrol. Airplanes also are called for patrol duty after heavy electrical storms which often set a number of fires in widely separated parts of the forest.

Incendiarism Decreased

An interesting by-product of aerial patrol work in the last few years has been its moral effect on incendiaries, careless campers and reckless industrial forest users. The first year that flights were made it was noticed that a severe outbreak of incendiarism stopped short as soon as the air patrol started. It was later learned observers in planes were reputed to be able to see through strong glasses long before the planes were heard or seen.

During the first four years of airplane cooperation on the National Forests, the plan was to have regular flights over the forested areas. In 1919 seven Army planes located at five bases flew 2,457 hr., covering 202,009 mi. in protecting the national forests of California. Regular schedules were maintained from June 1 to Oct. 31, and by means of these flights 442 fires were reported, twenty-seven of which were sighted before discovery by ground lookouts. In 1920, thirty-seven planes at five bases in California and one in Oregon were in service, and reported 741 of the 1,632 fires on the forests patrolled, detecting twenty-six fires before they were reported by ground personnel. Seven bases were in operation in 1921. Due to lack of funds, the air patrol work was greatly curtailed in 1922 and 1923, but in 1924 the $50,000 appropriation for this work was restored by Congress.

In view of previous experience it was found that, desirable as they might be, regular flights were not justified from an economic standpoint by the degree of protection they afforded as compared with that afforded by mountain peak lookouts. The periods of greatest usefulness of the airplanes have been those when the usual effectiveness of the mountain-peak lookouts were curtailed, after severe dry lightning storms, and when large fires were burning. It was therefore arranged to have planes at intervals of a few hundred miles held ready to make such flights as would add materially to the safety of the forests, and this has been the plan followed in the past two years.

Drop 150 Messages

The air patrol covers national forests in the States of California, Oregon, Washington, northern Idaho, and western Montana. Two planes, flying out from Spokane in 1925 made eighty-three flights, reported twelve fires ahead of all ground lookouts, and dropped 150 messages. Often because of lack of suitable landing places, they made single flights over 300 and 400 mi. of rougbest mountain country under adverse atmospheric conditions, sometimes being lifted hundreds of feet in the air by columns of hot air over fires. This was done without a single injury to personnel or equipment during the 400 hr. of flying.

Airplanes also have been found valuable in timber reconnaissance and in the study of terrain on forest areas. An aerial study of a portion of the national forest area of Idaho was completed last season, and it is expected more work of this nature will be done this year.

Proposed Air Mail Service

Postmaster General New has announced that the Department is considering the authorization of an advertisement inviting proposals for the transportation of mail by aircraft between Dallas, Waco, Austin and San Antonio, Tex., a distance of approximately 260 miles.

The establishment of such a route would afford the patrons at San Antonio, Austin and Waco and connecting points practically overnight service with Chicago, and would put air mail into New York City the following afternoon after mailing at Texas points.

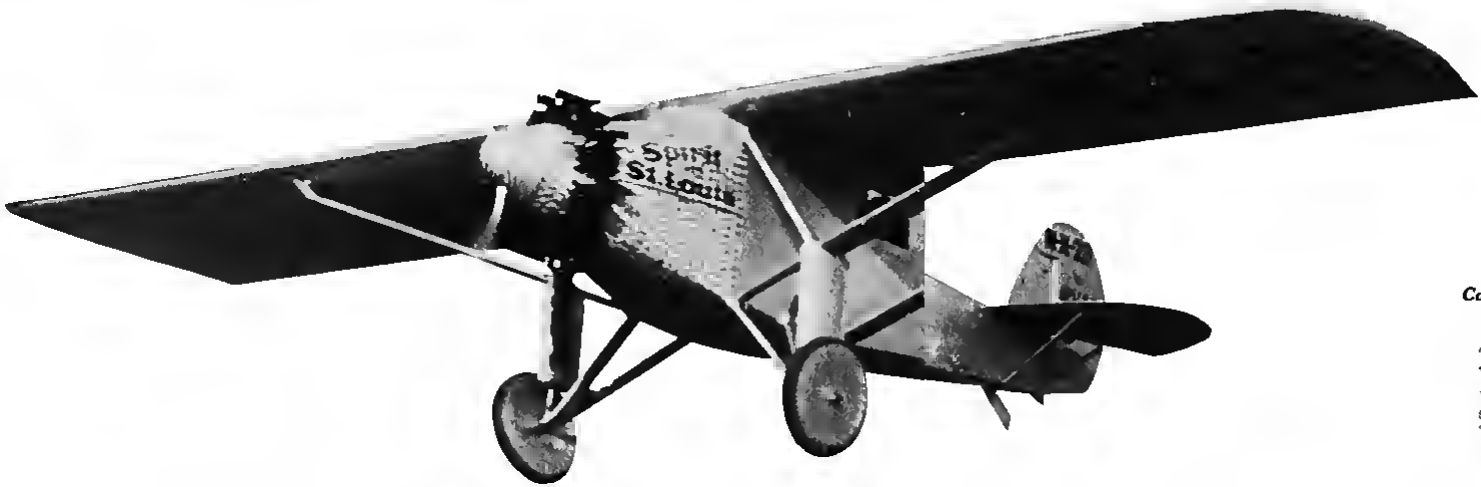
The present postage rates of ten cents per half ounce will afford a very reasonable means of communication between points in Texas, Chicago and New York City.

Consideration is also being given by the Post Office Department of extending this proposed route from San Antonio to Laredo and thus affording a continuous air mail service from points in the United States to Mexico, with the possibility of Mexico continuing the service into the interior of that country.

It was further announced by the Postmaster General that consideration is being given for proposals on bids for the transportation of mail by aircraft on a route between Dallas, Houston and Galveston, Tex., a distance of approximately 275 mi.

It is contemplated that this route will connect at Dallas with the existing air mail route between Dallas and Chicago about the middle of the present Summer when the Dallas-Chicago route goes on a night schedule.

Such an air mail connection will afford Houston and Galveston practically overnight service with Chicago, and an arrival in New York City the next afternoon after leaving Houston and Galveston.



Captain Charles A. Lindbergh's "Spirit of St. Louis."

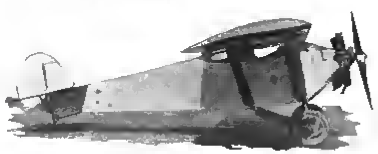
The first Plane to fly from New York to Paris and holder of the world's distance record for non-stop flight Distance 3610 miles Time 33 Hrs 29 Mn. 20 Sec.

THE MOST FAMOUS PLANE IN THE WORLD

CHANCE played no part in Captain Charles A Lindbergh's first contact with the Ryan organization It was on February 1, 1927, after thorough study and investigation, in the characteristic Lindbergh way, that he brought his Paris flight project to the attention of Ryan Airlines, Inc

In approaching the oldest aviation organization on the Pacific Coast, Captain Lindbergh was influenced by the long and varied experience of the Ryan organization in the design, construction and operation of commercial and pleasure airplanes, as well as the notable performance of the Ryan M-1 monoplanes in competition and in daily mail and passenger service

A BRIEF summary of the Ryan record of recent years includes operation since March 1925 of a successful passenger air line between Los Angeles and San Diego, Calif.



RYAN M-2 MONOPLANE (Three Place) With 150 Hisso motor $3750 with 180 Hisso motor, $4000 with Wright Whirlwind motor, $8100.

Ryan M-1 monoplanes are used exclusively on Contract Air Mail Route No. 8, operated by Pacific Air Transport, Inc, between Seattle, Wash and Los Angeles, Calif, 1099 miles, the longest single airway in the country barring the trans-continental route.

On Contract Air Mail Route No 12, operated by Colorado Airways between Pueblo, Colo, and Cheyenne, Wyo, via Denver, Ryan M-1 monoplanes also are used

Although first tested in February 1926, a Ryan M-1 monoplane won every event for planes of its class at the 1926 National Mile High Air Meet at Denver, Colo, including the Grand Sweepstakes Trophy for the best all-around airplane

In 1926 Ryan Airlines, Inc produced 30 commercial or pleasure airplanes, 27 of which were sold and placed in services requiring a rugged and reliable plane of excellent all-around performance.

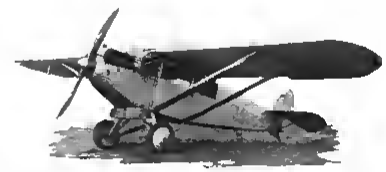
TO this experienced organization headed by capable and enthusiastic executives and engineers, Charles A Lindbergh entrusted his well thought out ideas for an airplane capable of the New York-Paris non-stop flight with a single occupant A principal consideration was that the Ryan N Y P should be completed within sixty days And eleven minutes short of the specified sixty days the N Y P monoplane was ready to fly.

Careful tests at San Diego, conducted exclusively by Charles A Lindbergh—a hop to St Louis—another to New York, and then the magnificent jump to Paris Charles A Lindbergh, the World's Embassador of Aviation, had done it. But back of all, careful preparation, a reliable plane and a premier pilot-navigator.

THE New York to Paris Flight and the World's airplane distance record are now history. Worldwide stimulation of flying has resulted In these United States, Charles A. Lindbergh and his Ryan monoplane "Spirit of St Louis" have in thirty-three and one-half hours instilled in the public an airmindedness that years of prosaic effort might not have accomplished The barriers of indifference and resistance are down. More students are applying for air training, more passenger flights are being sold, more air mail is being carried; increased demand for modern planes for commerce and pleasure flying has come almost overnight.

The Ryan Airlines, Inc. are prepared for this period of rapid expansion In the three-place Ryan M-2 Monoplane and the five-place Ryan Brougham will be found planes which cover a wide range of service and utility Their clean design, careful engineering, sound construction and excellent performance first brought to the Ryan organization the most famous airplane customer in the history of flight.

Ryan planes will give prestige and profit to your air work May we send you convincing performance details?



RYAN BROUGHAM (Five-Place). With 180 Hisso motor, $5100; with Wright Whirlwind motor, $9700.

RYAN AIRLINES, Inc.

San Diego, California

National Aviation Conference at St. Joseph

The National Confarence for Development of Commercial Aviation is to be held at St. Joseph, Mo., June 6 to 7 for the purpose of perfecting a working organization for the immediate development of American airways, and the acquisition and improvement of municipally owned landing fields, so that every section of the country can enjoy the same advantage of rapid transportation for mail, express and passenger traffic already established in Germany, Italy, France and England.

The conference has been endorsed by, Hon Wm. P. MacCracken, Jr., Assistant Secretary for Aeronautics, Department of Commerce, Washington, D. C., Hon. Edward P. Warner, Assistant Secretary for Aeronautics, Navy Department, Washington, D. C.; Hon Samuel A. Baker, Governor of Missouri, Jefferson City, Mo., Hon Louis V. Stigall, Mayor of St. Joseph, St. Joseph, Mo; Hon. Charles L. Faust, Representative, Fourth District of Missouri, St. Joseph, Mo.; Hon Trubee Davison, Assistant Secretary for Aeronautics, War Department, Washington, D. C., and Porter H. Adams, president, National Aeronautic Association, Washington, D. C.

High Praise for Scintilla

The important part played by Scintilla aircraft magnetos in Capt Charles A. Lindbergh's 3610 mile flight from New York to Paris, is emphasized in a telegram dated May 22, from the Wright Aeronautical Corporation to the Scintilla Magneto Co., of Sidney, N. Y., which reads as follows: "Captain Lindbergh's Ryan monoplane could never have reached Paris without the unfailing spark delivered by Scintilla aircraft magnetos to his Wright Whirlwind engine. Your splendid magneto is playing a prominent part in making history."

Two type AG9D Scintilla aircraft magnetos were used on Captain Lindbergh's Wright Whirlwind engine in the Paris Flight, and two of the same type Scintilla magnetos will furnish the spark for Commander Byrd's Fokker monoplane powered with three Wright Whirlwinds when he attempts the New York-Paris flight. The Bellanca monoplane which recently established the world's endurance record as a preliminary to the New York-Paris flight but later withdrawn, was also powered with a Scintilla equipped Wright Whirlwind engine.

Will Fly from Amsterdam To East Indies

Van Lear Black, a resident of Baltimore, Md., who is now in Holland, has announced trat he will fly from Amsterdam June 13 or 14 for the Dutch East Indies. He has chartered an airplane of the Royal Dutch Air Service, and will have as his chief pilot Geysendorffer, who was recently decorated by Queen Wilhelmina for his achievements as a pilot.

Mr. Black has announced that his flight would be a personal commercial trip and nothing in the nature of a stunt.

Will Fly To Eighteen European Capitals

As a demonstration of the distances which any traveler may cover by air in Europe at the present time, the Count de la Vaulx, president of the Internationale Federation Aeronautique, has commenced a journey which is scheduled to take him to eighteen European capitals, the trip starting and ending at Paris.

He will make the entire tour by air in planes of more than a dozen different nationalities, and for the greater part on regular commercial lines.

The cities to be visited on the flying tour are: Paris, Lisbon, Madrid, Rome, Belgrade, Bucarest, Budapest, Vienna, Zurich, Prague, Berlin, Helzingfor, Stockholm, Oslo, Copenhagen, Amsterdam, London and Brussels. In the cities he will visit the European aeronautical associations are affiliated with the Federation Internationale.

Hints For Air Travelers

The Imperial Airways give to every passenger on its lines a folder containing notes prepared for their convenience when traveling by air. They explain the normal movements of an airplane in flight; how to travel with the greatest comfort, the precautions which are taken against and the action to be taken in an emergency. The notes follow:

Special clothing is not necessary for air travel; clothing suitable for a motor-car journey is adequate.

Maps of routes can be obtained free at the various stations before departure.

Do not be concerned if the machine on starting taxies slowly towards a corner of the aerodrome. An aeroplane always starts and lands head against the wind. After a small run the machine almost imperceptibly rises from the ground.

We recommend passengers to place cotton wool in their ears to deaden the noise caused by the engines.

Slight deafness is sometimes caused by atmospheric pressure, and *immediate* relief can be obtained by either just blowing your nose, with the nostrils pinched together, or, when landing, going through the action of swallowing.

In order to turn, an aeroplane banks—one side is raised above the horizontal and the other side lowered. This is a perfectly safe movement.

"Air pockets" do not exist, and when "bumps" occur they are caused by upward and downward currents of air, which have a similar effect upon aeroplanes as waves have on ships.

Dizziness, as experienced by some people when looking down from a high building, is unknown in aeroplanes, as there is no connection with the earth.

Air sickness affects fewer passengers than sea sickness; several of the proprietary remedies are completely efficacious. Cuspidors are provided for the use of passengers. Experienced passengers say that the finest cure for sea sickness is fresh air.

The windows of the cabin can be opened or shut as desired.

All Imperial machines flying on the Continental scheduled services have lavatory accommodations at the rear of the cabin, and passengers can freely move about the cabin without affecting the balance of the aeroplane.

Drinking water and glasses are carried on all Imperial aeroplanes.

It is prohibited by Government Regulations to smoke or light matches in the aeroplanes.

Nothing whatsoever should be thrown out of the windows of the aeroplane.

In the case of necessity, passengers can communicate with the pilot through the aperture in front of the cabin.

Your pilot is in constant touch with his Terminal Aerodrome by means of wireless telephony. He receives reports regarding the weather conditions at frequent intervals, and can ask for any information he needs at any time.

Lifebelts are provided, as on ships, in case of emergency when crossing the Channel.

Put the belt on as you would a waistcoat, by passing the arms through the shoulder-straps so that the brass operating lever comes to the bottom right-hand side. Hook the brass buckles in front.

Hold the air bottle (which will be felt inside the belt) in the left hand and press the operating lever upwards with the right hand. If the cylinder does not work, inflate by mouth, after unscrewing the valve on the left side of the belt. When sufficiently inflated, screw down tightly the mouthpiece valve.

Every aeroplane is fitted with an emergency exit in the roof of the cabin. It is clearly marked as such and will open by pulling the ring attached to it.

Passengers need have no cause for alarm when hearing the engines slowing down: this is only an indication that the pilot is preparing to land, that he wishes to reduce speed, or that he desires to fly at a lower altitude which may, in his opinion be advisable owing to calmer weather or better visibility, etc.

FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions, Bureau of Foreign and Domestic Commerce

Freight Service on Imperial Airways

Freight packages are called for and delivered throughout London and Paris and received and delivered at the aerodrome in several other cities by the Imperial Airways. Bills of lading are provided with full instructions. Charges are collected in advance or upon delivery.

Larger packages can be arranged for but the following maximum sizes are specified: 3 ft. 6 in. x 2 ft. 3 in. or if to be transshipped to other air lines, 3 ft. x 2 ft. 6 in. or 2 ft x 1 ft. 6 in. The usual maximum weight is 150 lb. but a package weighing 336 lb can be handled. Light and bulky packages may be charged for according to the cubic space required. Live stock and motorcycles can be carried.

Insurance rates are quoted on shipments from and to all points and vary according to the means of carriage before and after the company handles them and the condition and nature of the goods.

Some of the rates quoted are: London to Paris per package not exceeding 2 lb, 2 shillings; not exceeding 11 lb, 4 shillings, 10 pence; not exceeding 33 lb, 11 shillings, 6 pence; not exceeding 66 lb, 18 shillings, 8 pence; not exceeding 112 lbs, 28 shillings.

Air Survey of African Mining Region

For the first time in African mining history airplanes are to be used in making preliminary surveys. The Rhodesia Congo Border Concessions, Ltd., has contracted with an English company for the surveying of their concession of 50,000 sq. mi. on the Congo Border of Northern Rhodesia, and pilots and planes have now arrived in South Africa.

Work on the survey will be started about the end of April, and it is expected by those interested in the project that about one-half of the concession will be surveyed in four months. D.H. 9 planes equipped with Nimbus engines are to be used. The cameras will be electrically driven and will use No 9 film, 65 ft. long and taking 100 exposures 7 in. by 7 in. On the side of the film there is a margin of two inches on which will be shown the exact time of the exposure. Photographs will first be taken obliquely and from them a reconnaissance index will be prepared. The photographs will then be taken vertically and a map of the surveyed country will be drawn.

New Dutch Airplane Factory

The Aviolanda Air Plane Manufacturing Company has been established at Rotterdam for the purpose of constructing eighteen Dornier seaplanes, ordered by the Dutch Department of Colonies at the Hague. Those partaking in the enterprise include the Pot Company at Rolnes near Rotterdam and A. Burgerhout, of Rotterdam, both shipbuilders.

The new concern has leased the yard of A. van Dnyvendijk at Papendrocht, opposite Dordrecht, on the Rhine channel near Rotterdam, and the construction of the seaplanes there will begin at an early date.

Opening of Cairo-Karachi Service Postponed

The opening of the regular service on part of the Cairo-Karachi commercial air line has been postponed owing to the refusal of the Persian Government to permit airplanes to fly over its territory. It is understood that the British Government is negotiating with the Persian Government to obtain the necessary permission and that the service will be inaugurated as soon as the matter is arranged.

France Uses Planes Against Insects

Airplanes have been used in France for the destruction of insects for the first time. The pine forests of Alsace and Lorraine have been attacked by the tidonia puniaria and large sections have been destroyed.

A plane carrying 250 lb. of arsenate of lime flew over the forest at a height of several feet only from the tops of the trees. Although the experiments were interfered with somewhat by heavier rains, it is stated that the insect has nearly been eliminated from this particular forest, at a cost of about 350 francs per hectare.

Airport at Seville, Spain

In connection with the new airplane service soon to be established between Seville and Buenos Aires, plans have just been announced by the Seville Chamber of Commerce for the establishment of an airport at Seville. This project calls for extensive construction works, to cost approximately 30,000,000 pesetas (approximately $5,000,000 at present rate of exchange). The Company in charge of the airport works will advance the money and will be reimbursed by the Government in annual payments. The personnel will consist of 2,000 workmen and employees at the beginning, and when the duralumin and engine factories are established the force will be doubled.

New Italian Aircraft Corporation

A new aircraft corporation has been recently organized in Rome under the name of Italian Aero Consortium (Consorzio Aero Italiano.) The purpose of the corporation is to construct, trade in and operate aircraft on land, sea and river routes. The corporation began business with a paid-in capital of about $40,000, but the shareholders are bound to increase their subscriptions to 20,000,000 lire. The leading shareholders are: The Navigazione Generale Italiana, the Istituto di Credito Marittimo, the Lloyd Sabaudo, Cav. di Gr. Gr. Attilio Odero, Comm. Antonio Maresealchi, the Banco di Napoli, the Banco di Sicilia, the Banca Commerciale Italiana, the Credito Italiano, the Banca Nazionale di Credito and the Banco di Roma. The largest block of stock is held by the Navigazione Generale Italiana.

Extend Service To Basra

The fortnightly air service between Cairo and Bagdad is to be extended to Basra (Turkey) and a further extension will be made to Karachi in the near future. Mail from London will reach Basra in seven and a half days. For the present the service will be fortnightly. At Basra it will connect with the fast mail steamer due at Karachi six-and-a-half days later, making a total of fourteen days from London. The first dispatch of letters from London by air mail left Karachi on Jan. 2 by fast gulf steamer for Basra, where connection was to be made with the Imperial Airways Hercules plane to Cairo, for transmission by the P. and O. steamer to Marseilles, and thence overland to London.

K. L. M. Asks Subsidy

The K. L. M. (Royal Dutch Air Transport Co. of Holland) has asked for 600,000 guilders subsidy for 1927, which proposal has not yet been acted upon. The policy of the Dutch Government in this respect has not changed since last year. The cities of Rotterdam and Amsterdam have provided very up-to-date airdromes for the use of the airlines. The radio service is provided by the Department of Public Works, and consists of weather reports three times daily.

AIRPORTS AND AIRWAYS

Denver, Colo.

The airplane is rapidly coming into its own as an agent of mercy as well as an established factor in the cold business world.

An Eaglerock airplane was recently substituted for ambulance and railroad train to transport Dr. Homer Lathrop of the Lathrop Clinic, Casper, Wyo., to the Presbyterian Hospital, Denver, for emergency treatment. Dr. Lathrop, suffering great pain, chose the Eaglerock rather than a tortuous 14 hr. trip by rail. The air trip was made in 3½ hr. The doctor was accompanied by his ten year old daughter Mary Jane, who is also to undergo an operation, although of a minor nature.

The plane was piloted by Major D. P. Wardwell of the Wyoming Airways, Eaglerock dealers for the states of Wyoming, Montana and western Nebraska.

Back in the early days, F. M. Case, now 86 years of age, traveled west to the state of Colorado behind a yoke of oxen, watched the development of the stage coach, pony express, railroad and automobile. On Sunday, May 15, he experienced the thrill of airplane travel.

Mr. Case, accompanied by his son, Dr. M. B. Case of Denver, went out to the Alexander Airport, climbed into the cockpit of a new Eaglerock, was flown over the city of Denver. The elderly gentleman was heartily enthused over his ride and pronounced his air trip the most wonderful of his life. He is now prevailing upon his son to become a pilot while the game is still young, maintaining that those who enter aviation today will reap the reward of the pioneer.

Boston, Mass.

By Daniel Rochford

Flying from Boston has reached its hundred hour a week average of Summertime and, with the increasing commercial operations of this year, should pass the 150 hour mark by mid-June.

Events of aviation interest on the schedule are the New England Air Mail Week, June 26-July 2, sponsored by the aviation committee of the Massachusetts American Legion. A public demonstration will take place at the bandstand on Boston Common June 27 at noon. Tuesday the Chamber of Commerce will be host to Mr. H. H. Blee, of the Department of Commerce, Aeronautics Branch, who will give an illustrated lecture at noon. Thursday the National Air Tour is expected to reach the airport. Friday will be the anniversary of the first air mail flight by Colonial Air Transport, Inc., and suitable ceremonies will take place at the Airport. The National Air Tour will likewise continue its way this day.

The governors of New England states, mayors of cities and towns, and the Legion generally are cooperating for the air mail week and slogan, evolved by Captain Sumner Sewall, wartime ace, who, in addition to his five planes, destroyed two enemy balloons and never gave any signs of poetic genius, urges,

Send a letter by air
To someone, somewhere.

Major Herbert A. Dargue visited Boston in his flagship "New York" and spoke at the Chamber of Commerce May 27.

Three Boston planes flew down to Hartford for the Brainard Field air demonstration May 21. Capts. C. W. Ford, R. F. Raymond, Jr., Lieuts. Charles Clark, George Lusk, James Swenson, and Roberts made the trip in Jennies.

The Boston Airport Corporation has a new Stinson-Detroiter cabin biplane and is hauling many sight-seers over historic Boston, Lexington and Concord.

The Air Service of New England, Inc., has been busy with its Fairchild aerial cameras doing a lot of oblique work in and around this vicinity. Warren Colby and Daniel Rochford have been handling the camera. B. F. Billings has been doing the piloting.

Down at Squantum improvements on the new flying field, being financed and built by young Dennison, a Tech man of a few years back, nears completion. Dennison expects to operate Kinner airplanes. The Navy is interested in his project and may later cooperate in building a large land field at Squantum. They now have only their naval reserve air station beside the big wartime ship-building plant.

At Camp Devens the temporary Army field has been completed and planes from Boston have landed there. It will be used during the Summer training schedules at the Ayer cantonment.

Colonial Air Transport, Inc., has been operating single-engined Fokker Universals the past month, having taken the big tri-engine off the run until such time as a decision may be made about further passenger carrying. For the present they are not hauling passengers.

An airplane service to Nantucket Island is being planned by the Boston Airport Corporation for early in June. A group of wealthy Summer residents there are to underwrite a regular schedule of trips.

Casper, Wyo.

Closely following the opening celebration of the "Powder River" Flying Club House and flying field at Casper, Wyo., on Saturday, May 7, the state was swept by one of the most terrific blizzards in its history. Snow banked in drifts ten and twelve feet in depth about the visiting planes and hangar.

On the day following, word reached the new club house that several prominent Casper families, including seven children, were snow bound on the impassable roads in Deer Park on Casper Mountain. All haste was made to clean the way for a take-off for some of the planes on the field but it was Tuesday morning before any measure of success was attained. Lieut. Maughan, the "dawn to dark" flier, in a visiting Army plane and Walt Storrie, chief pilot of the Wyoming Airways in an Alexander Eaglerock managed to get into the air and after several circling trips about the surrounding country located the party in a short time. All available men in the city formed a shovel gang and successfully got the entire party back to Casper.

The pilots of both Eaglerock and Army planes were hailed as heroes of the rescue and the City of Casper is theirs for the asking.

St. Paul, Minn.

By W. S. Schley, Jr.

Bob Radoll, holder of the air mail record of 6 hr. 40 min., for a round trip from St. Paul, Minn. to Chicago, Ill., and return, made another flight on May 10. This time Radoll took off in the plane Matrimony, with Miss Helen Lois Lengenfelter, of Oak Park, Ill. Wednesday, May 11 when Bob landed at the Wold Chamberlain field Mrs. Radoll was a passenger on their honeymoon trip.

Among the first to congratulate the couple were Col. L. H. Brittin vice-president and general manager of the Northwest Airways mail line, Dave Behneke, Speed Holman, pilots, and Andrew Hufford, chief mechanic.

After the usual shower of rice and old shoes, the couple were escorted to the hangar for luncheon.

Fort Smith, Ark.

The landing field of the Fort Smith Aircraft Co. is located just west of South Fort Smith, about four miles south of the business center of Fort Smith. It contains seventy-five acres, is almost a half mile east and west, and a quarter mile north and south. It is hard packed ground, rolling, sodded and is fine for taking-off or landing in any kind of weather. It is bounded on the east by South Fort Smith, on the south and west by the Arkansas Central Railway and on the north by the Arkansas United States Highway, No. 71. There are a number of bus lines on the highway and the South Fort Smith suburban railway, on which there is a car service every hour, is within a half block of the company's hangar. The field is marked by the regulation white circle, and the name "Fort Smith Aircraft Co. Airport," is painted on top of the hangar. Gasoline, oil and mechanical service are available at the hangar.

At the present time, the Fort Smith Aircraft Co. is doing commercial work, the school, which is called the Fort Smith Flying School, giving both ground and flying instruction. Five students are now enrolled and one has soloed. During the flood, this company used its planes to search for marooned people and to carrying passengers and merchandise in the flooded districts.

UNITED STATES AIR FORCES

Pilot Drops Life Line on Cutter

The use of airplanes to save ships in distress at sea was demonstrated as a practical possibility of the immediate future in an interesting test conducted successfully at Crissy Field, Cal., recently. An Army plane taking off from the field carried the free end of 4,000 ft. of line to a Coast Guard cutter anchored in the bay. Flying low, Master Sergeant C. W. Kolinski, pilot of the plane dropped the line accurately across the cutter. Life saving possibilities as shown by this test are very great, according to Capt. W. B. King, of the Coast Guard, who arranged it. Guns aboard cutters or on shore ordinarily can shoot little more than 300 yds., it was pointed out. The Coast Guard believe it practicable for an airplane to carry the end of a light steel cable, sent out from shore, to a ship a mile or two at sea.

Philippine Air Corps Exhibit

The Air Corps contributed an interesting section to the recent Philippine Carnival. This exhibit was prepared in the shops of the 66th Service Squadron, and much commendation is due the personnel engaged in preparing it. The sectioned Liberty engine prepared by the Motor Overhaul, under the direction of Staff Sgt. Leslie L. Wells, was an especially interesting feature. The Sixth Photo Section prepared an attractive series of photos and camera demonstrations. The DH4B airplane was a source of much interest and a thousand questions which taxed to the utmost the knowledge of the personnel in charge. Exhibits from the armament section, propeller, fabric and parachute departments of Camp Nichols were equally as attractive.

Engineer Students Visit Langley Field

A party of twenty-eight officers, members of the 1927 Class from the Engineers School at Fort Humphries, Va., recently made a visit and inspection trip to the Lighter-than-Air Area, Langley Field, Va. In the airship hanger the visitors were met by Capt. Charles P. Clark, Commanding Officer of the 19th Airship Company, who gave a talk on the flying of airships, etc. Following the lecture the Engineers inspected the TC-5 and TC-9 airships, the hangar equipment, and the hydrogen gas plant.

Anti Aircraft Work in the Panama Canal Zone

France Field, Panama Canal Zone, recently cooperated with the Anti-Aircraft Defenses of the Panama Canal Department by supplying night flying airplanes in accordance with their instructions.

The night was fairly clear with few clouds. There apparently was no great impediment to the operation of the searchlight batteries. There are powerful searchlight and listening devices at either end of the Canal.

Three NBS-1 bombers took off, piloted by Captain Randolph, Lieutenants Martin and Davidson, pursuant to instructions. They proceeded to the Pacific side to simulate a bombing attack on the Miraflores and Pedro Miguel Locks, eluding the searchlights if possible. They were accompanied by four DH's, piloted by Lieutenants Williams, Parker, Cadets Jones and Beedle. Flares were used by the planes to indicate a bombing attack.

The NBS-1's flew over a particular area at about 7,000 ft., while the DH's cruised about another area at about 9,000 ft. Captain Broberg, Lieutenants Douglas and Pearcy proceeded to the Pacific side as well with three PW-9's. One DH, piloted by Lieutenant Williams operated at will, his job being to render the listening devices ineffective by flying low and creating as much racket as possible.

A concentrated attack was made at 7:45 p.m., the pursuit using the Pedro Miguel Locks for a target, while the other planes bombed the Miraflores Locks. Flares were used by the bombers and DH's. The pursuit used Very pistols. From then on the planes attacked at will. From the point of view of persons on the ground the searchlight exhibition and the flares floating about the sky was a fine play of pyrotechnics and lighting effects.

Somewhat the same maneuver was executed several days later on the Atlantic side. The object of this problem was to stimulate a bombing attack on Gatun Locks without interference by searchlights. Three DH's took off at dusk, piloted by Lieutenants Canfield, Howard and Cadet Park, proceeding to 11,000 ft. They were followed by three Martins and one DH, piloted by Lieutenants King, Larson, Davidson and Ballard, respectively, proceeding to an altitude of 6,000 to 8,000 ft.

The pursuit operated three PW-9's, piloted by Captain Broberg, Lieutenants Douglas and Pearcy, at 3,500 to 5,000 ft. The bomber and DH formations were above a loose cloud strata. The objective was at nearly all times perfectly visible, but it was impossible for the ground units to illuminate the formations.

The combined attack was carried out at 8.00 p.m., the bombers using the south end of the locks, pursuit the spillway and power plant, and observation the north end of the locks as objectives. The ground lighting systems and landing signals functioned perfectly. Each formation landed in the prescribed order without difficulty.

Eighty-eighth Squadron to Brooks Field

The 88th Observation Squadron, with Lieut. Clifford C. Nutt, left Wright Field, Fairfield, Ohio, on May 4 for station at Brooks Field, Texas. This squadron has been at Wright Field for the last four years. Among those who have been in command of this squadron at various times since it was stationed at Wright Field are Major H. J. Knerr, Capts. H. R. Flounders, Henry Pascale, John G. Colgan, Major J. C. McDonnell, Capt. F. F. Christine, and several others who were in command for brief periods.

Chanute Field, Ill.

The storm that swept across central Illinois May 19 spent some of its fury at Chanute Field. Several hangars were demolished, small buildings were blown down and other damage sustained. The storm forced E. Coulter, pilot of the St. Louis-Chicago air mail plane to land in a corn field near Cantrall, Ill. The plane became mired and the mail was transferred to a tram.

Army Air Orders

First Lieut. John M. Davies, Air Corps, relieved from detail with the Org. Res., Seventh Corps Area, and from assignment and duty with the 88th Div., Minneapolis, and will proceed to Chanute Field and report to com. off.

First Lieut. Erik H. Nelson, Air Corps, Douglas Aircf. Fact., Santa Monica, to Dayton, Ohio.

Capt. Harry G. Raves, jr., Air Corps (Coast Art. Corps) is relieved from detail in the Air Corps. He is relieved from duty with the 2nd Div., Fort Sam Houston, and is assigned to the 63rd Coast Art., Fort Winfield Scott.

First Lieut. Victor E. Bertrandias, Air Corps McCook Field, to Santa Monica as the Air Corps representative at the Douglas Aircraft Co.

Sec. Lieut. Fred Cassius Reed, Air Corps Res., Washington, to active duty McCook Field, reverting to inactive status June 15.

Major Ray Sassen Miller, Air Corps Res., St. Paul, to active duty McCook Field, reverting to inactive status May 28.

A board of officers to consist of Major Shapler W. Fitzgerald, Air Corps, Washington; Major Leslie MacDill, Air Corps, McCook Field; Major Roy S. Miller, Air Corps Res. and Capt. Charles T. Phillips, Air Corps, Washington; Capt. Walter F. Kraus, Air Corps, Washington; First Lieut. Barney M. Giles, Air Corps, Fairfield, is appointed to meet at McCook Field, Dayton, at the call of the senior member of the board for the purpose of considering the designs of airplanes for National Geard use and of making report as to the winner or winners of the competitive award made.

Capt. Harold Kernan, Air Corps (Field Art.) is relieved from detail in the Air Corps. He is relieved from further assignment and duty as student, Air Corps Prim. Fly. Sch., Brooks Field, is detailed as instructor of Field Art., Okla. Nat. Guard, and will proceed to Enid, Okla. and take station.

Sec. Lieut. Henry L. Hughes, Air Corps, transferred to Coast Art. Corps. He is relieved from further attachment to Sec. Div., Fort Sam Houston and will proceed to San Francisco sailing on transport scheduled to leave that port for Philippine Islands June 10.

First Lieut. Hobart D. Reed, Air Corps (Field Art.) is relieved from detail in the Air Corps. He is relieved from duty with the 2nd Div., Fort Sam Houston is assigned to 9th Field Art., Fort Snelling, Minn.

First Lieut. Clarence Crumrine, Air Corps is detailed as a member of board of officers appointed to meet at McCook Field to consider designs of airplane for National Guard use.

Sec. Lieut. Alexander R. Sewall, Air Corps (Field Art.) is relieved from detail in the Air Corps. He is relieved from duty with the 2nd Div., Fort Sam Houston is assigned to 17th Field Art., Fort Bragg.

Capt. William Bartelt, Air Corps (Cav.) is relieved from detail in the Air Corps. He is relieved from duty with the 2nd Div., Fort Sam Houston and is assigned to the 5th Cav., Fort Clark.

First Lieut. Byron T. Burt, jr., Langley Field, is assigned to station at March Field.

Sec. Lieut. Leo H. Dawson, Air Corps, Chanute Field, is assigned to station at March Field.

Major Byron Q. Jones, Air Corps, Fort Leavenworth, to Fort Omaha.

Major Frederick L. Martin, Air Corps, is detailed as a member of the board of officers appointed for the purpose of recommending individuals for decorations.

Major Harold A. Strauss, Air Corps, Scott Field, to Kelly Field.

Capt. Russell C. Snyder, Air Corps, (Field Art.) is relieved from duty with the 2nd Div., Fort Sam Houston, and is assigned to 6th Field Art., with station at Fort Hoyle, Md.

Sec. Lieut. Marvin J. McKinney, Air Corps, Kelly Field, to Brooks Field.

Major Walter G. Kilner, Air Corps, Washington, to New York City, sailing Oct. 7, via Government transportation, for the Philippine Islands.

Donald H. Nelson, Air Corps (Cav.) is relieved from detail in the Air Corps. He is relieved from duty with the 2nd Div., Fort Sam Houston, and is assigned to the 14th Cav., Fort Sheridan.

Navy Air Orders

Lieut. Comdr. William Masek det. comm. VS Squad. One, Aircf. Squad., Sctg. Fleet to Nav. Air Sta., San Diego.

Rad. El. Chester S. Denton det. USS Arkansas, to Nav. Air Sta., Pensacola.

Lieut. (jg) Henry M. Cooper det. USS Langley, to temp. duty Nov. Air Sta., Pensacola.

Lieut. (jg) Francis M. Hughes det. USS Pennsylvania, to temp. duty Nov. Air Sta., Pensacola.

Lieut. (jg) John L. Nester det. USS Sands, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Richard W. Ruble det. USS Pennsylvania, to Nav. Air Sta., Pensacola.

Ens. Rex S. Caldwell det. USS Cory, to temp. duty Nav. Air Sta., Pensacola.

Ens. James H. Carrington det. USS Macdonough, to temp. duty Nav. Air Sta., Pensacola.

Ens. Joseph M. Carson det. USS Argonne, to temp. duty Nav. Air Sta., Pensacola.

Ens. John A. Charleen det. USS Pennsylvania, to temp. duty Nav. Air Sta., Pensacola.

Ens. Richard Davis, Jr., det. USS Henshaw, to temp. duty Nav. Air Sta., Pensacola.

Ens. Richard K. Gaines det. USS Williamson, to temp. duty Nav. Air Sta., Pensacola.

Ens. George C. Hirst, Jr, det. USS Idaho, to temp. duty Nav. Air Sta., Pensacola.

Ens. Carleton C. Hoffner det. USS Charles Ausburn, to temp. duty Nav. Air Sta., Pensacola.

Ens. Thelman Lester det. USS Maryland to temp. duty Nav. Air Sta., Pensacola.

Ens. John G. Moore, det. USS Idaho, to temp. duty Nav. Air Sta., Pensacola.

Ens. Warren P. Mowatt det. USS Mississippi, to temp. duty Nav. Air Sta., Pensacola.

Ens. Robert G. Norman det. Battleship Div., Battle Fleet, to Nav. Air Sta., Pensacola.

INDEX TO ADVERTISERS

PUBLISHER'S NEWS LETTER

The world has had its impression of aviation so closely associated with the war-time flier that it may be possible that the success of "Slim" Lindbergh will mark another change that has been given little consideration. Most of the war-trained airmen have now had ten years of experience. Many have reached an age when they feel that piloting alone is not an objective to which they should be contented to aspire. They wish to become owners of fields, operators of air lines, manufacturers or engage in executive work where their experience will be of benefit to them. Their places will be taken, naturally, by the post-war trained flier of which Lindbergh is a perfect type. It is fortunate that so attractive a personality was able to represent this new group of airmen for he will inspire confidence and gain the respect of the coming passenger air traffic.

* * * *

One of the major problems of air transport is the selection of the flying personnel. Until recently, the large reservoir of war-trained aviators has been the natural source of supply. But as men grow older and more experienced they expect increased rewards. This means a gradual raising of costs. There will come a point where the younger and more adaptable pilot will be required for replacement or to meet the increasing demand for expanding air transport needs. It is to this class of serious and able young men that Lindbergh so happily represents, that the air transport operator of the future will have to look. The more experienced pilots will be required in the management branches for it is axiomatic that "fliers must direct fliers."

* * * *

Already it has been observed that thousands of young men have had their ambition turned to aviation by the great success that has come to this young pilot of twenty-five years who was only twelve years old when the Great War started. The flying schools have had a great increase of applicants. Every firm in the aircraft industry has received enquiries from many young men who aspire to take a part in this coming business. There would appear to be a danger that their anxiety to enter the field and their willingness to make great sacrifice, to gain a toe-hold may create an over-supply. This has been the case with pilots who have been trained by the hundreds at the many flying fields that are to be found at almost every city from coast to coast. In every field of endeavor, it is the great and immediate rewards that attract new talent. The great publicity that has been given to the offers that have been made to Lindbergh is certain to create a stampede to his profession.

* * * *

To absorb this great number of applicants, is to be one of the nice problems that will have to be solved by the aircraft industry. The great increase of factories that are manufacturing commercial types of planes will take care of some of those who are mechanically inclined. The older constructors who have built up a source of supply for government aircraft is another branch of the industry that will expand under the impetus of the five year program. The accessory field will develop along with the growth of the above basic factors of the trade. Aerial Service operators are discovering new uses for aircraft almost daily. They are proceeding along sound lines and reaping their reward after many lean years. But the main trend is toward the air transport field. The ever present comparison with the astounding growth of the automobile attracts the imaginative type of young man who foresees a similar development for airplanes. The absorption of the young men with talent of aeronautics will become a very real problem and one that should be given immediate consideration by all now engaged in the industry.

* * * *

When AVIATION pointed out some time ago the possibilities, from a diplomatic standpoint, of fliers becoming "Air Ambassadors" it did not venture to let its imagination carry as far as Captain Lindbergh's short career in Europe has demonstrated. A new organization may well be formed which can be truly termed The Diplomatic Air Corps. Italy would be represented by Col. de Pinedo; France by Captain d'Oisy, Spain by Commandant Franco; England by Sir Alan Cobham, the United States by Major Dargue for South America and Captain Lindbergh for Europe. Other countries have their candidates and soon it is not too much to expect that an additional course will have to be introduced at all flying fields giving instruction in international law and diplomatic courtesy. As every soldier of France is said to carry a marshal's baton in his knapsack, in a similar way every pilot has the possibility of transforming his joy stick into a magic wand of international good will. If pilots realize the great value of such cordiality between nations, there may develop a rivalry between the airmen of the world that will have an entirely new influence on the trend of diplomacy.

Where to Fly

CONTINUED

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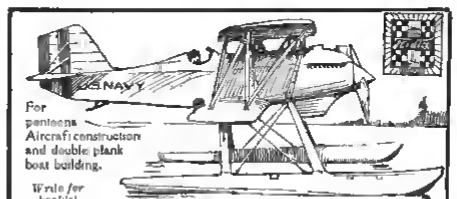

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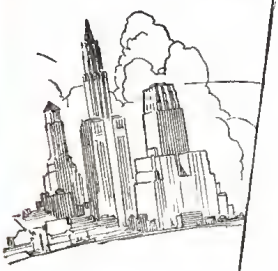

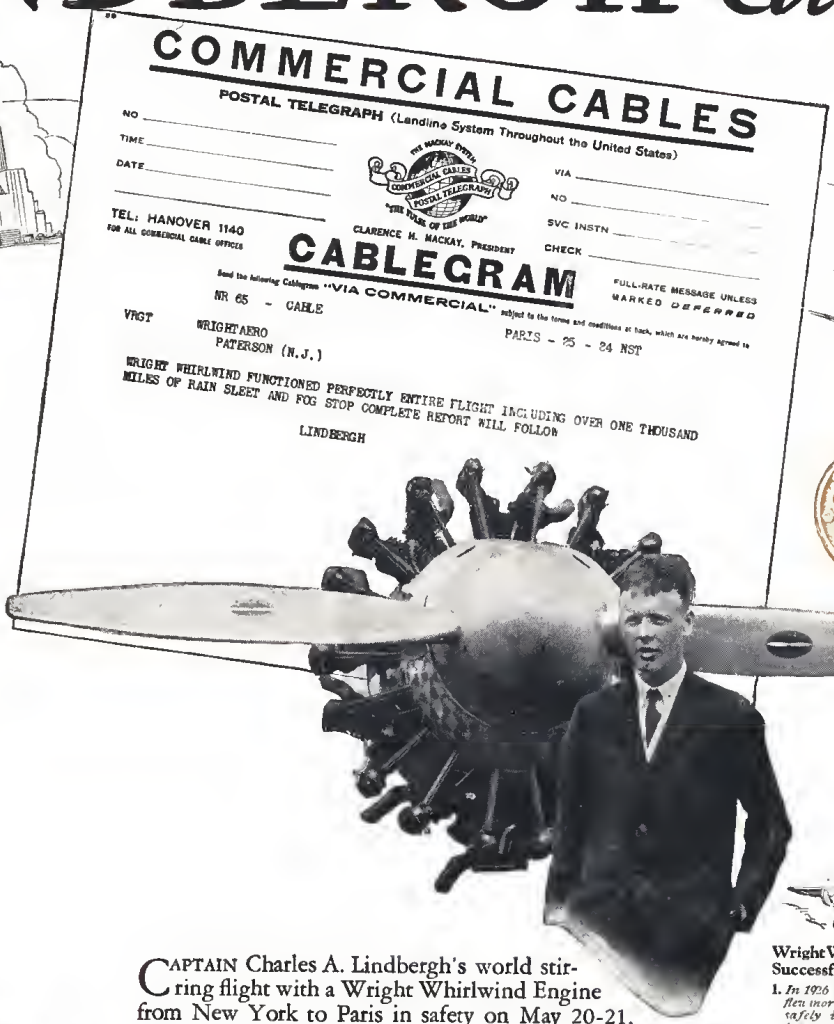

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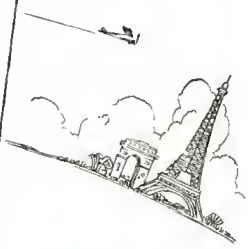
LINDBERGH



CAPTAIN Charles A. Lindbergh's world stirring flight with a Wright Whirlwind Engine from New York to Paris in safety on May 20-21, 1927, is but the culmination of a remarkable series of aeronautical successes and records covering the past three years.

It is significant, too, that the planes of all three Transatlantic Flight aspirants—Byrd, Chamberlin and Lindbergh—were powered with Whirlwinds, proof positive that the faith of America's greatest airmen was pinned to the safety of America's greatest air-cooled aeronautical engine.

Wright Whirlwind Engines have been the inspiration of a vast majority of the most efficient, safe plane designs in the air today.

Send for Bulletin 176 an interesting, non-technical booklet showing twenty-eight of America's leading, safe airplanes powered with Wright Whirlwind Engines.

Wright Whirlwind Engines are in use on 11 of the most important United States air mail routes and fly more mileage per day in safety with United States mail than the distance between New York and San Francisco.

Wright Marine Engine Successful Performances

Wright Typhoon Marine Engines hold a high place in the light cruiser and express runabout marine field.

1. *1924, won first and second place in the Annual Gold Cup Regatta, Detroit, Mich.*
2. *1925, express runabout "Teaser" beat the Empire State Limited from Albany to New York establishing a record of 2 hours and 40 minutes for this trip.*
3. *1926, runabout "Imp" was timed for the fastest lap ever made in the Gold Cup Races at Manhassett Bay, N.Y.*

Wright Whirlwind Engine Successful Performances

1. *In 1926 Whirlwind Engines flew more than 1,750,000 miles safely in commercial and private airplanes.*
2. *All Whirlwind Engines finished with a perfect score in the (Ford) Annual Reliability Tour, 1925.*
3. *Carried Commander Richard Byrd over the North Pole and back in a Fokker three Wright Whirlwind engined plane, 1926.*
4. *Won first, second and third place in 2350 mile (Ford) Annual Reliability Tour, 1926.*
5. *Established new World's Endurance Record of 51 hours, 11 minutes and 20 seconds in a Wright-Bellanca plane, Chamberlin and Acosta, pilots, 1927.*
6. *Powered Captain Lindbergh's Ryan Monoplane in his nonstop flight from New York to Paris, 1927.*
7. *In 1926 Whirlwind Engines flew more than 2,000,000 miles in the service of the U.S. Navy.*

RELIABILITY—DURABILITY—ECONOMY

WRIGHT

AERONAUTICAL CORPORATION *Paterson, N. J., U. S. A.*